

COAL AGE

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Aftermath

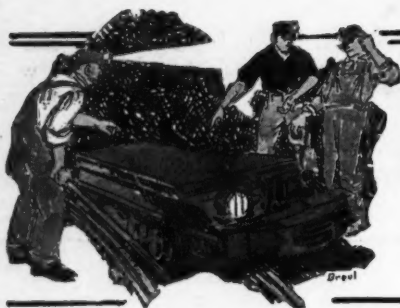
BY RUFUS T. STROHM

OF old, when Monday rolled around,
As Mondays always do,
With drab monotony we found
But half a working crew;
And some of those were thick of head
And bleary as to eye,
But, happily, such days are fled,
For Miningville is dry.

EACH party, wake, or like affair
Once ended in a fray;
But stabbing is becoming rare
And murder is passé;
For folks go calmly to their beds,
Nor seem to want to shy
Beer-bottles at each other's heads
Since Miningville went dry.

THE children looked as though they had
Scarce half enough to eat;
The womenfolk were coarsely clad,
And all were bare of feet;
But chubby kids are everywhere,
New dresses multiply,
And there are shoes enough to spare
Since Miningville went dry.

A MIGHTY wave of civic pride
Has risen in the town,
And dirt and rubbish swept aside
Have brought the death-rate down;
The grocer toils with all his might,
The butcher's boy is spry,
The baker hustles day and night—
For Miningville is dry.



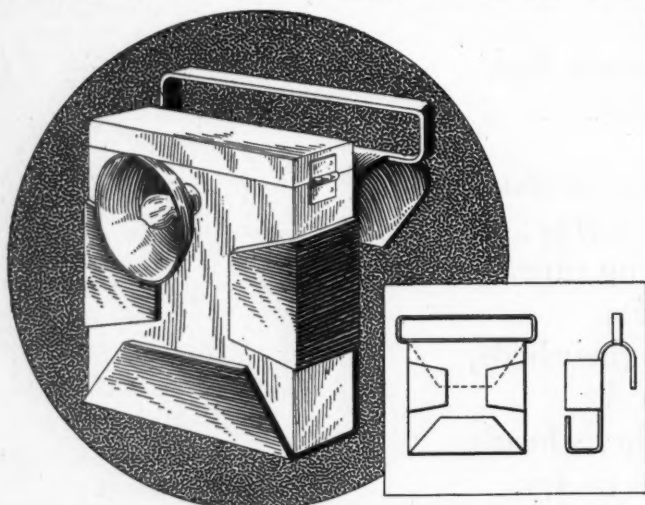
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Holder for Edison Battery Tail Light

By RALPH W. MAYER
California, Penn.

The state law of Pennsylvania requires tail lights on haulage trips. The Edison battery lamp, with the incandescent globe fastened close to the battery, is usually used for this purpose in gassy mines, the long rubber covered wire being discarded. The Pittsburgh Coal Co.'s Crescent mine, for hanging this battery to the



DETAILS OF A BATTERY HOLDER

end of the last car in the trip, uses a holder which any mine blacksmith or machinist can make.

A piece of sheet iron $\frac{1}{2}$ in. thick is used. This is cut to the required size. The bottom is bent up for the bottom of the battery to rest upon, the sides bent in to hold the battery from falling out, and the top bent over to the side opposite the battery, to act as a hook for hanging upon the top of the car.

An iron rod is riveted to the portion bent over to act as a hook. This rod is formed into a loop, and both of its ends are riveted fast. This serves as a handle wherewith to carry the case and battery when these are not hanging on the car. The sides of the case, or those portions bent over, are cut to a V-shape as it is not necessary that the battery be completely covered. These merely act as clips to prevent the battery from falling out of the case. This construction also makes the case lighter to handle. The piece which is reflexed to the side opposite the battery to permit hanging the case to the car should be sufficiently long to form a hook that can not be jarred off the car.

AN OBJECTION to the use of powdered coal as fuel is that none of the byproducts is saved in this method of combustion. Some processes which include a saving of part of the volatile matter before the fuel is pulverized for use in that form would have conservation advantages.

To Return a Motor to the Track

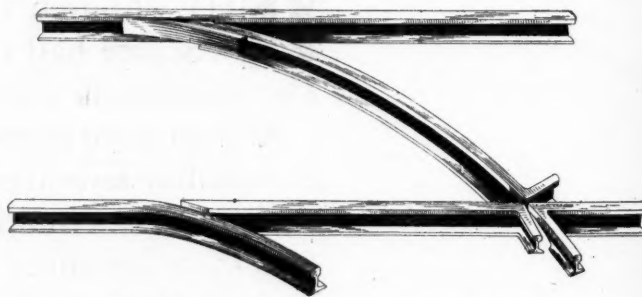
By JOE POVICH
Ziegler, Ill.

When a locomotive gets off the track in the mine, a tie placed against the rib and against a spoke of one of the locomotive driving wheels will force the machine into place upon the rails. Of course, this method of procedure is only applicable to locomotives with outside spoked drivers. With such machines, however, this expedient often obviates sending for another locomotive to pull the stalled one into place, thus saving time, output and inconvenience. The requisite tie can usually be found without difficulty.

Aid to Slewing a Mining Machine Into Switches

By MACHINE RUNNER
Sullivan, Ind.

In my experience in operating a coal cutter I have found the device described below helpful at times when the mine is equipped with slew switches leading into the rooms. I carry a small piece of flat iron about the size of a fish plate. This is flattened out to a thin point on one end. Just before the machine reaches the point of the switch I wish to enter, I stop the machine and lay this piece of iron so that it will overlap the point of the lead rail and extend along the side of the



DEVICE SLEWS COAL CUTTER ONTO SWITCH

main track with the thin edge toward machine. I then turn on the power and the iron forces the machine onto the switch without the assistance of the helper. This allows the helper to remain with the cable at all times and thus prevents its being hung up on a spike, switch point or some other obstacle with which it may come in contact.

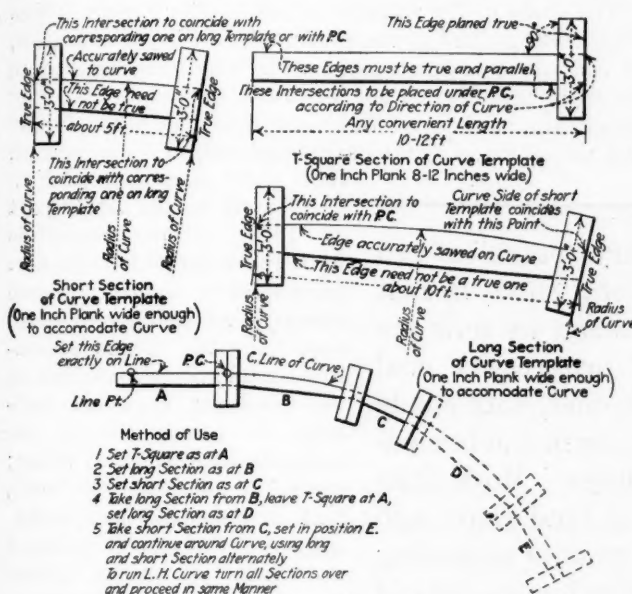
The use of the device will bring with it many advantages. It serves not only to lengthen the life of the cable, but it is not at all far-fetched to say that it may also be the means of saving the life of a driver who might run a load over the cable during the absence of the helper should his services be required to help slew the machine into the switch.

Laying Out Short-Radius Curves

BY JOHN FABER HANST
Pittsburgh, Penn.

Short-radius curves such as are used for the turning of headings off main entries can readily be aligned by the method described in this article. It has the advantage of being so simple that the miners themselves can apply it. Its utilization requires no calculation, and the results are sufficiently accurate for all ordinary work.

A curve templet of a required radius is laid out on a level floor, or on level ground, by the engineer, using a steel tape of sufficient length. To do this, a center point is marked, and, with the tape lengthened to the



METHOD OF LAYING OUT SHORT-RADIUS CURVES

exact radius, an arc is struck off on a piece of 1-in. plank of any convenient length, 10 ft. being about right. The same is done with another plank half the length of the first. Similar cross-pieces are marked at each end of the curve planks, taking care to nail them exactly at 90 deg. to the curve. This is easily done, provided the curve planks are held firmly in position when the arc is struck off and that the end points are marked. The edge of the tape itself will serve to strike off the correct line on which to nail the cross-pieces. A T-square piece is also constructed about 8 or 10 ft. in length.

The templets being constructed, proceed as follows: At the point of curve (P.C.) of the curve set a plug or place a nail in the cap. On the tangent, and in a direction opposite to the curve, set another point at such a distance that it will fall within the length of the T-square section of the templet. Where the points are placed by the engineer in the roof, points on the floor or ties can be secured, of course, by suspending plumb-bobs from the line plugs. The T-square can then be set so that the true edge is along the line of the tangent. This square being held firmly in place to T-head of the first curved section can be placed against the T-head of the T-square. Thus the curve edge of the section can be used to align the curve.

To reverse the direction of curve, simply turn the templet over, thus using the same templet for right or left curves. Now hold the curve templet and bring

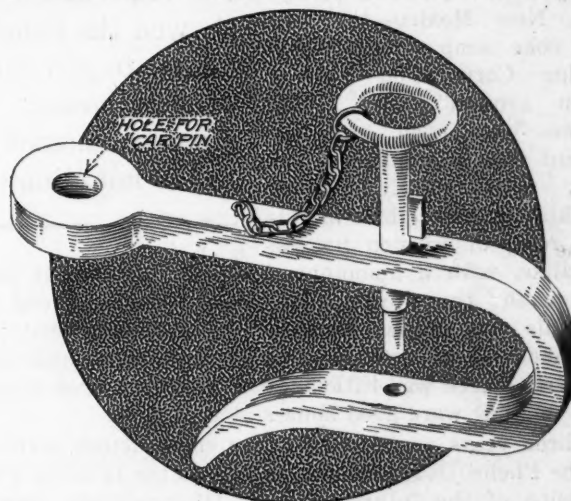
the shorter templet to position, carrying one ahead of the other as far as necessary. In this manner, with one setting of line plugs by the engineer, the miners can check up their drift after each blast, or as often as desired. The short and long sections enable the true line to be carried right into the breast at all times without difficulty.

Of course, when the P.T. is approached, it will be necessary for the engineer to run a survey around the curve and spot the exact P.T., giving lines for the tangent at the same time. Most of this work, however, can be done in the office, especially if the survey points are figured on a coördinate system. This, by the way, is the only logical and systematic way of surveying a mine, and with a good accurate map on a scale of 50 ft. to the inch it is possible to determine the position of a point with great accuracy.

For the benefit of those to whom this method of laying out a curve is new, sketches of the templet and the manner of application are given. The method is in general use in many of the mines of the Lake Superior iron ranges, and, so far as I know, was developed by the engineers of the Cleveland-Cliffs Iron Company.—*Engineering and Mining Journal.*

Self-Uncoupling Hook for Use in Hoisting and Haulage

In slope hoisting and certain other forms of rope haulage, it is advantageous to employ a connection between car and rope that may be disengaged easily at the will of the triprider. The accompanying illustration shows a hook that may be coupled, jaw down, to the regular



COUPLING HOOK THAT MAY BE DISENGAGED QUICKLY

drawbar of the leading car of a trip, say on a slope. To this hook the clevis or tow-chain on the end of the cable is attached and the feathered pin inserted through both parts of the hook.

It will readily be perceived that as long as the feathered pin remains in place the tow-chain, or clevis, and the hook will not part company. When the trip, however, passes over the knuckle at the top of the slope and the pin is withdrawn by the triprider, the tow-chain will slip off of the jaw as soon as sufficient slack has been secured. After the trip has been brought to rest the hook may be uncoupled from the loaded trip, coupled to the empties, and the cable clevis or tow-chain attached ready for lowering.

Modern Housing Standards at Dawson, New Mexico

BY CHARLES F. WILLIS*
Bisbee, Ariz.

SO MANY towns, like Topsy, "just grow" indefinitely, that it is unusual to find one, after it is well grown, that decides to get away from the old habit of "just growing" and set about to develop in a systematic way. Today the more progressive companies, after an intensive study of the situation, develop standards based on the fact that the house is a place in which to live, not merely a roof over the head.

When it is considered that the home is the sixteen-hour-a-day workshop for the housewife, it is inconceivable why the efficiency and conveniences that surround our factories and mines have not been brought universally to the home. Why should not the houses always have been built with due regard to sanitation and health, with some thought of the problem of the fatigue of the housewife, with standards of ventilation and light? An intelligent conception of what a house is used for should make it possible to put it to the greatest use.

Up to three years ago, Dawson, New Mexico—the coal and coke camp of the Phelps Dodge Corporation—was a "just grown" town. The houses were good, even excellent as coal camps go, but they were merely houses. Nothing was thought of building rows of wooden houses, all alike, with a monotonous skyline, making it necessary for the workman to count from the end to find his own house. It gave him a feeling that his neighbor's house was the same as his in every nook and corner. There was little idea of adequate open areas, and yet they were good houses at that time.

Three years ago, however, the construction division of the Phelps Dodge company attacked the problem with a vision of the future needs of the workman; recognizing that he really wanted something better, that he had an individuality which might be expressed in a home; that it really did make a difference if the housewife had to move a bed out from the wall every time she used it, and that an irregular skyline was much more satisfying to look at and little if any more expensive. With all of these things in view, it was a question of building such a house that could be rented at a reasonable rate.

Obviously houses with individual design were preferable, but this added a cost that meant higher rent. So the problem was to incorporate in the design the best ideas as to convenience and sanitation, without requiring

payment for æsthetic features, which the usual occupant of the houses did not appreciate. It was a matter of evolving certain standards of housing, living up to those standards and removing, as fast as circumstances would permit, the type of house that did not so conform.

The study of the situation made by the Phelps Dodge engineers resulted in their designing 14 types of houses, of various room combinations and size to accommodate different families. Four of these types were shortly abandoned because of their similarity to other types; but ten of these types have remained, and are now in their third successful year.

As early as the latter part of 1916, certain requisites were set down which are now recognized by industrial home planners as being minimum requirements. These requisites include the elimination of the tenement type; no hallways or narrow courts; the complete utilization of space; plenty of room at the front, back and side of each building; preferably 90 ft. between the backs of houses (never less than 45 ft.); no basement or cellar, thus removing the likelihood of such space being used as living quarters by those to whom good housing as yet means little; finally, cross ventilation, either

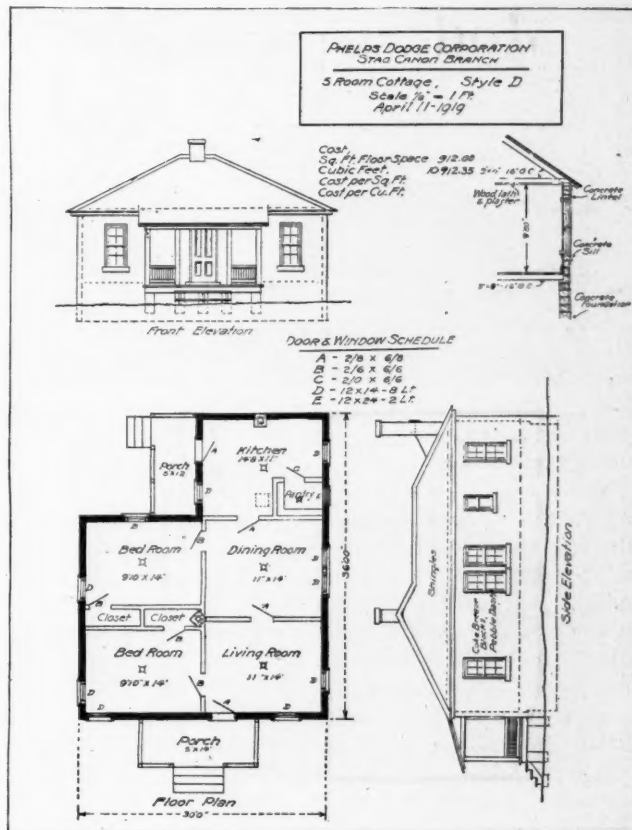
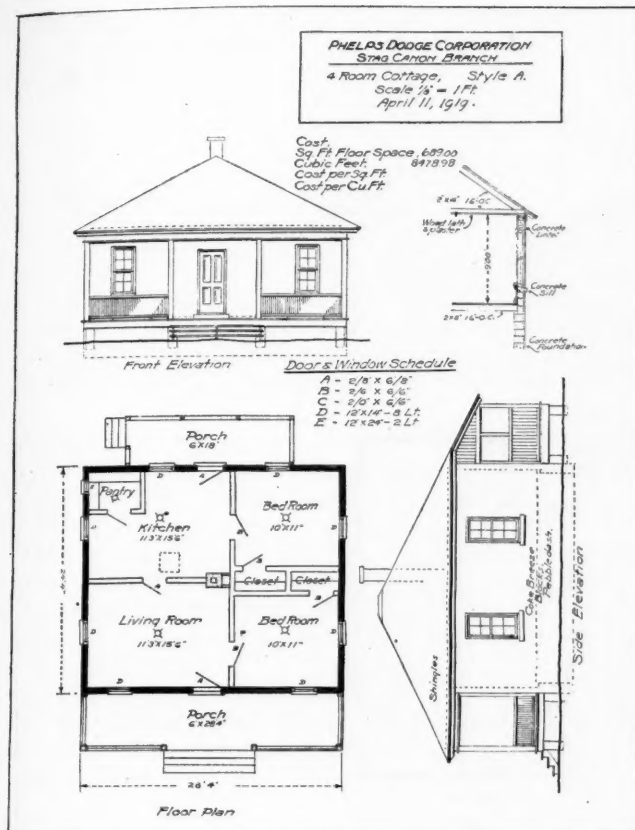
The old familiar colliery "patch" of red houses, arranged in long rows, is fast disappearing. In its stead we now see around the mines of progressive coal operators villages of homes, with shade trees along the streets or in the fenced-in yards of the dwellings. More than one experiment of this kind years ago showed the beneficial results attending efforts to give employees homes instead of mere houses. This article deals with a modern housing development adapted to the hot climate of the Southwest.

through windows on both sides of the room, or by means of windows and a transom over the door.

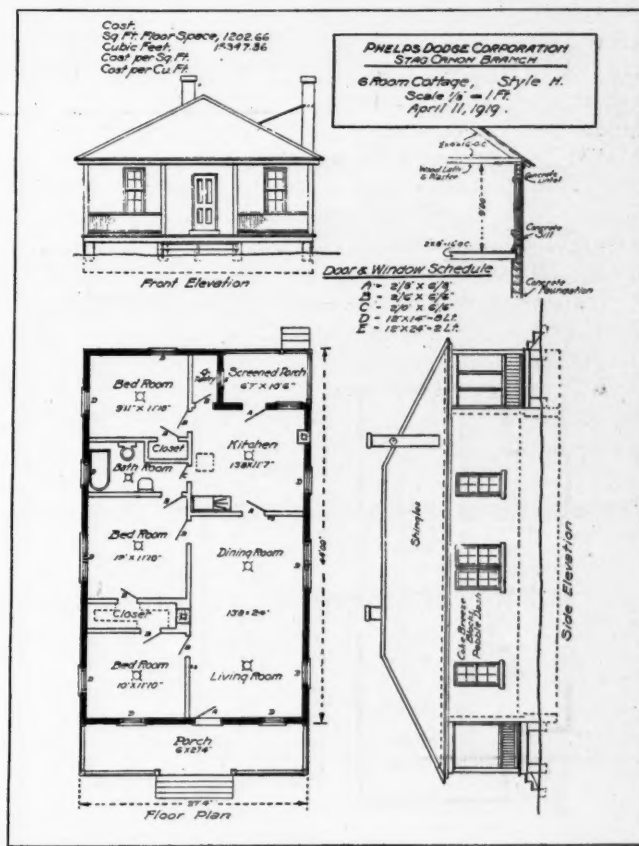
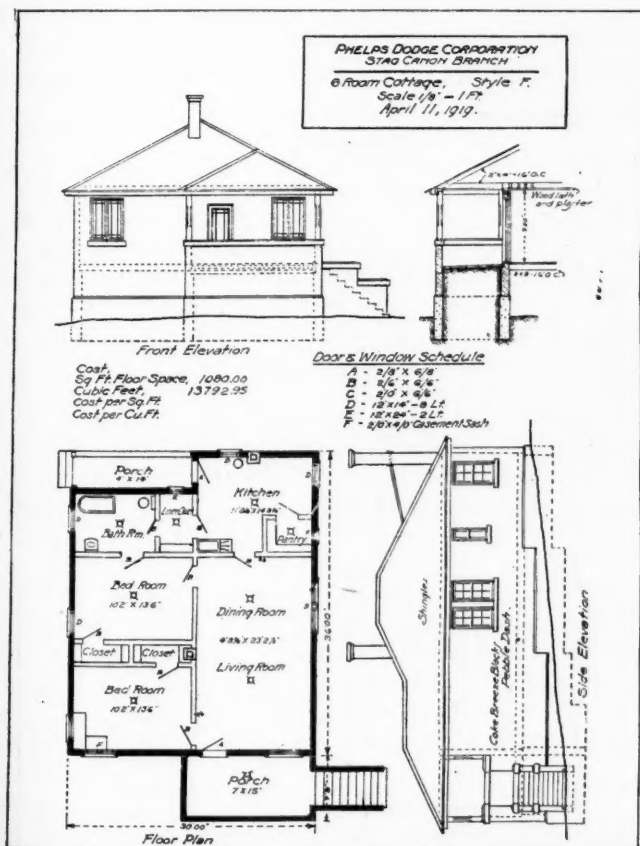
If the Dawson houses are lacking in anything that makes for good homes, the kind desired by the American workman today, it is probably in outside appearance. Every type of house has a railed front porch and a screened rear porch; but there is a certain monotony of appearance in the pebble dash finish used on all of the new houses. This monotony is increased by the uniform slate gray color of the concrete finish, although this is somewhat offset by the various colors of the roofs. The simplicity of design was adopted with a purpose in view, however, for elaborate exteriors would have added to the expense and consequently to the rent. A definite amount of money can be spent on a house to permit of charging a rental of \$2 a room per month, and it was considered that the renter would rather have the money expended on the inside where he lived than on the outside of the house. Experiments are being made at the present time, however, in cement coloring and spray painting, which promise to relieve the color monotony.

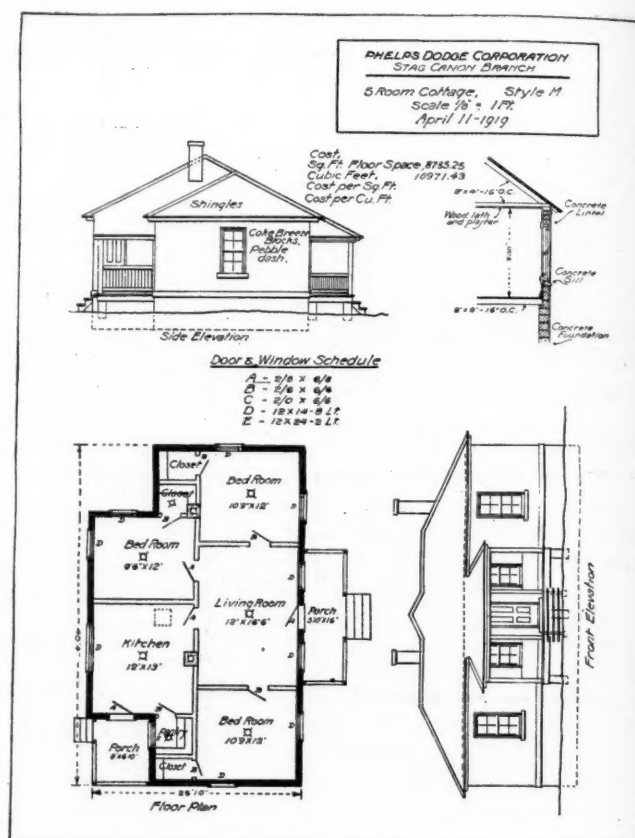
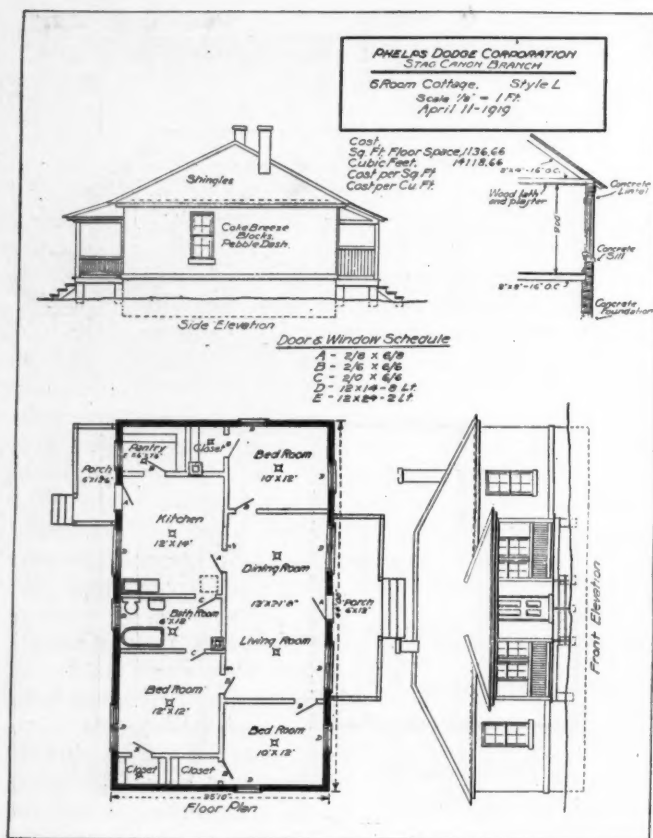
The elimination of second stories and even a second half-story has eliminated the fatigue from climbing

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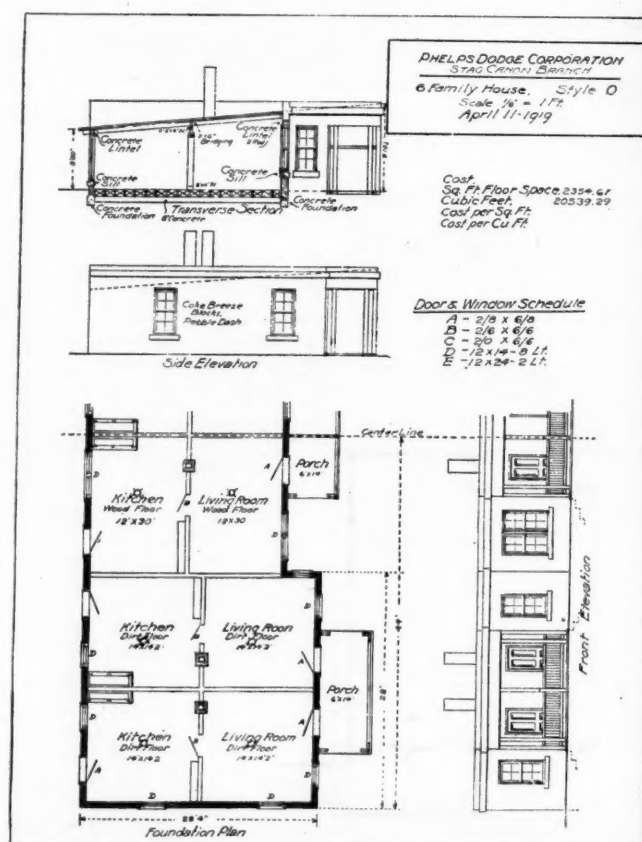
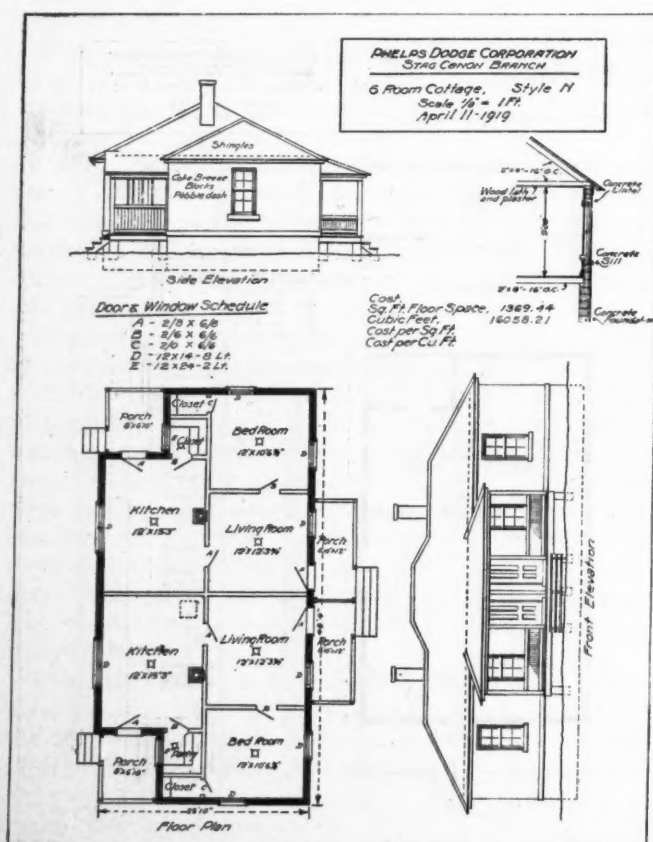


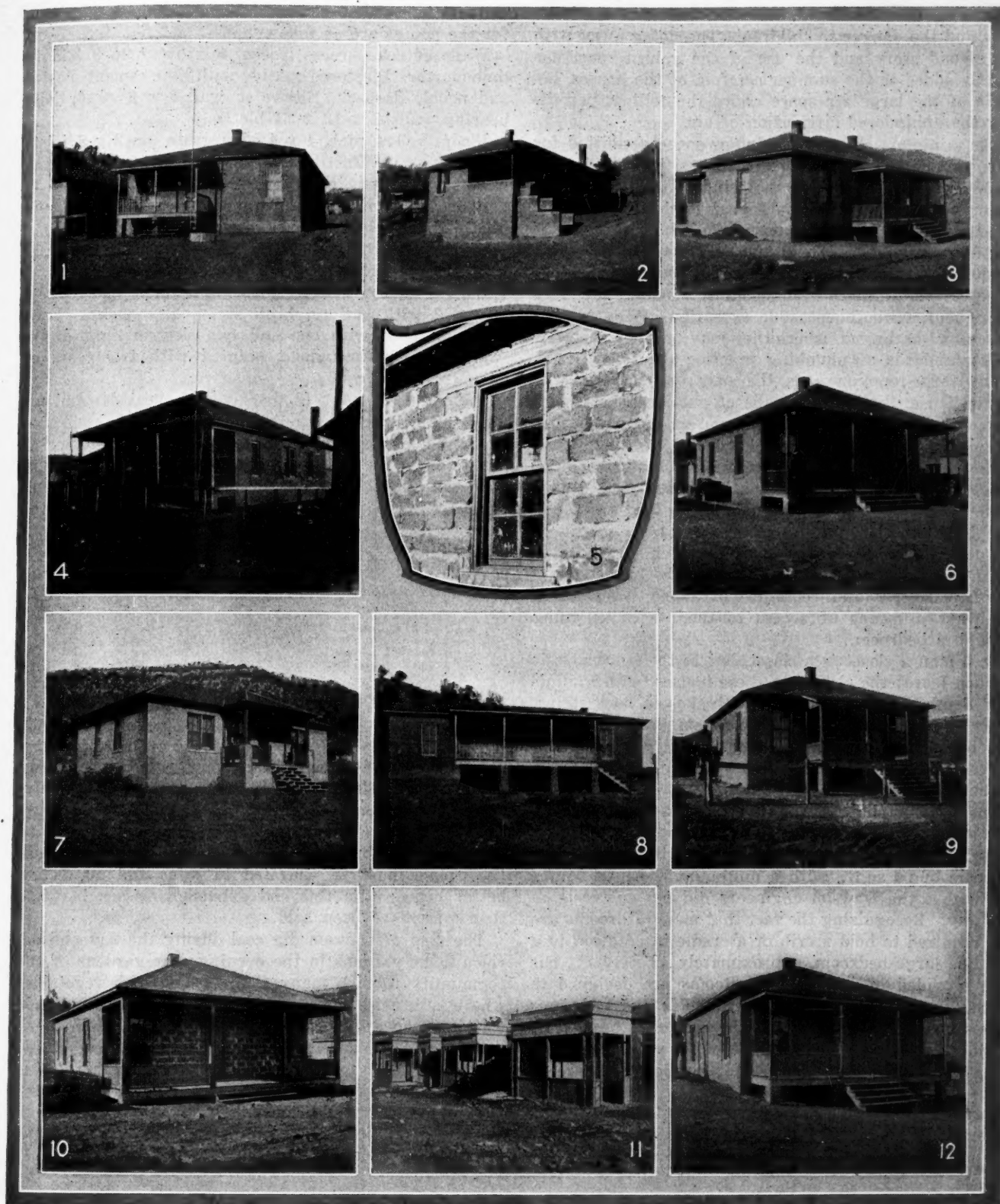
The plans here shown of some of the homes erected by the Phelps Dodge Corporation at Dawson, New Mexico, embody very excellent ideas as to convenience and sanitation





These plans have eliminated hallways and narrow courts. Complete utilization has been made of all space, with ample room at the front, back and side of each building





Types of Houses Erected by the Phelps-Dodge Corporation for the Use of Its Mine Workers at Dawson, New Mexico

- | | |
|---|--|
| 1—Style E, five-room and bath. | 7—Style K, six-room and bath. |
| 2—Style F, five-room and bath. | 8—Style L, six-room and bath. |
| 3—Style N, double three-room. | 9—Five-room house. |
| 4—Style H, six-room and bath. | 10—Four-room house shown in Fig. 6, before plaster was put on. |
| 5—Close-up, showing coke-breeze blocks used in building the houses. | 11—Style O, six two-room apartments. |
| 6—Outside of four-room house after plastering. | 12—A four-room house. |

stairways, the additional fire risk, the abuses of the attic and the danger to children. The doing away with the second story and the use of the gabled room has greatly added to the summer comfort of the houses, because of the large air space above the ceiling, permitting the unhindered circulation of air.

The minimum amount of window space permitted for a room is 20 sq.ft., opening directly to the outside. In a few cases there is but one window in a room, the larger number, however, having at least two windows, arranged with different exposures. Where the size of the room permits of only one window, or a double window on a single side, transoms are put over the door for cross ventilation. Double hung windows are used throughout, with the possible exception of the pantry, closets and bathroom, where they may be pivoted. New York standards of plumbing practice are followed.

The three-room type is the only one built in the double house, this for the sake of outside appearance; it consists of a kitchen, living room and bedroom. The four-room type has an additional bedroom; the five-room type has three bedrooms, with a living room of sufficient size to be a combination living and dining room. One five-room type is similar to the four-room, except that the large living room is divided for a living and dining room. Front porches, back screened porches and a closet in every house complete the general layout of the rooms. Bathrooms are arranged so that there is always a means of access to them without going through a bedroom.

To a man a closet is a closet, but to the housewife it is much more; the closets in these houses, with a minimum depth of 36 in., equipped with shelves, hook strips, hooks and a place for rods, are a real joy. The same may be said of the pantry, which is well equipped with shelves and closets, and which opens directly off the kitchen.

The size and shape of the rooms represent a considerable study. One way to plan a house that will rent cheap is to have small rooms, but a minimum size of bedroom of 96 sq.ft., with a minimum width of 9½ ft., shows that the Dawson engineers did not cut costs in this way. Recognizing the fact that many bedrooms are also required to hold a crib or a cradle in addition to a bed, one large bedroom, approximately 12 x 14 ft., has been provided in each house. Rooms are designed to fit the furniture which they will hold; the bedrooms have space for the bed so that the head may be against a wall; the dining rooms provide buffet space against a wall, and in the four- and five-room houses there is wall space for a piano. A 9 ft. ceiling is uniform.

Dawson is fortunate in having plenty of building material. A concrete block, made with one part cement and nine parts ordinary coke breeze, has been found

very efficient and economical. The general specifications for the houses are as follows:

Walls of coke breeze blocks, mixture 1 to 9 laid in lime mortar. Plastered outside with lime cement plaster and pebble dashed. Blocks on wall 8 x 8 x 16, joist bearing walls 8 x 12 x 24 blocks.

Floors yellow pine, 1 x 4 edge grain, on 2 x 8 joists 16 in. c. to c. Partitions 2 x 4 studs, 16 in. centers, wood lath and plastered, Brussels finish.

Roof shingled, with tin hip shingles on ridges and hips. Chimneys 8 x 8 brick, lined with 8 x 8 flue tile.

Windows double hung, 12 x 14 glass, 8 light, and 12 x 24 glass, 2 light; all doors four-panel, 1½ inch.

Lumber, clear native pine. Pantries and closets equipped with shelves, hook strips and hooks. Each room equipped with one and two electric light drops. All woodwork throughout painted with two coats of paint in desired colors.

During 1917 and 1918 there was a great demand for houses in Dawson, due to the increase in coal production brought about by the war, and a sufficient number of houses were built according to the new standards to make an appreciable showing in the town. The following list gives the number of each style built in the last two years:

Style	Type	1917	1918	Total
A	Four rooms.....	20	15	35
B	Four rooms.....	20	15	35
D	Five rooms.....	8	1	9
E	Four rooms and bath.....	3	1	4
H	Five rooms and bath.....	1	1	2
K	Five rooms and bath.....	4	2	6
L	Five rooms and bath.....	3	2	5
M	Five rooms.....	23	21	44
N	Double three-room.....	9	8	17
O	Six apartments, two rooms each.....	2	3	5
Totals.....		93	67	160

Dawson has a cosmopolitan population, representing many nationalities and people with all standards of living. It has been appreciated by the company in Dawson that good housing is not the only essential to improving standards of living, but that in some cases the people must be educated to want and appreciate better homes. To this end extension classes in home economics have been held.

The men of Dawson dig coal during the day and develop home gardens in the evening; the gardens of the community furnish many a dinner of fresh vegetables where otherwise cans would be opened. It is made easy to keep a garden; water is furnished free to all houses, and for several years prizes have been offered by the company for the best gardens. But their value is now so well known that it is doubtful if the prizes offer much if any additional inducement.

Table I represents the estimated costs on each type, and are wartime costs.

TABLE I—ESTIMATE OF PROPOSED COTTAGES, FOR 1918

Material	Style A	Style B	Style D	Style E	Style H	Style K	Style L	Style M	Style N	Style O
Lumber.....	\$220.68	\$212.40	\$235.74	\$269.80	\$323.64	\$296.30	\$311.73	\$273.16	\$303.64	\$1066.04
Shingles.....	57.47	56.15	58.65	65.00	80.20	76.49	76.49	70.48	87.97	79.80
Millwork.....	91.12	94.07	103.40	124.27	147.44	147.40	146.20	109.75	143.56	197.92
Hardware, etc.....	63.53	57.94	68.12	76.13	82.88	80.80	89.84	76.52	90.56	171.79
Blocks, lime, etc.....	350.31	351.00	421.60	435.75	471.18	465.68	467.28	446.28	519.50	713.35
Hauling.....	75.80	75.80	88.10	89.00	95.00	93.00	91.00	95.00	95.00	120.00
Grading.....	15.00	15.00	15.00	15.00	17.50	17.50	17.50	15.00	17.50	18.00
Lumber for forms.....	10.00	10.00	10.00	10.00	11.00	11.00	11.00	10.00	11.00	12.00
Lights.....	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Outhouse.....	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00	32.00	96.00
Plumbing.....	.....	.....	.....	370.00	370.00	370.00	370.00	.....	.....	.....
Total materials.....	\$902.41	\$890.86	\$1019.11	\$1457.45	\$1601.34	\$1560.67	\$1583.54	\$1109.69	\$1303.23	\$2477.40
Labor—erection.....	414.00	404.00	528.00	642.00	669.00	642.00	642.00	510.00	656.00	1153.00
Totals.....	\$1316.41	\$1294.86	\$1547.11	\$2099.45	\$2270.34	\$2202.67	\$2225.54	\$1619.69	\$1959.23	\$3630.40

Permissible Explosives

BY JOHN E. MILLER
Huntington, W. Va.

SYNOPSIS — *Permissible explosives are only permissible if used in prescribed quantity and according to prescribed methods. It is necessary to protect all explosives from dampness to prevent deterioration. The proper use of explosives and the efficient shooting of coal is an art.*

A PERMISSIBLE explosive is one that has been approved by the United States Government as permissible for use in gaseous or dusty coal mines. The explosives used in coal mines may not only occasion accidents such as occur in the use of explosives elsewhere, but may cause widespread disaster by igniting explosive mixtures of mine gas and air or of coal dust and air, or both. It does not follow therefore that if a mine is free from gas, any explosive that may be at hand can be used with propriety; for coal dust and air may cause quite as serious an accident as may gas were it also present.

Prior to 1907 any and all kinds of explosives were used in coal mines without much regard to the safety accompanying the use of proper explosives or proper practices. In the latter part of that year, four grave mine disasters occurred in close succession—at the Monongah Mines in West Virginia, where 368 men were killed; the Darr Mines in Pennsylvania, where 160 were killed; the Naomi Mines in Pennsylvania, where 34 were killed; and the Yolande Mine in Alabama, where 61 were killed.

These frightful disasters plainly demonstrated that both humanitarian and economic needs demanded that steps be taken to prevent the recurrence of such accidents. In 1908 Congress made a special appropriation for an investigation of the cause of mine explosions, and in May, 1910, by Congressional Act, the Bureau of Mines was created. It established a testing station at Pittsburgh, July 1 of that year. Here the permissible explosive was born. Today there are 152

offsprings, many of them weaklings, we must acknowledge, but embracing nevertheless a lot of good, healthy youngsters now nearly ten years old, and perfectly capable of taking their place with the most seasoned miner in the production of the world's fuel.

The effect of the work of the Bureau of Mines station since its installation in testing, classifying, licensing and counselling the proper explosives and proper practices in their use in the coal mines of the country cannot be overestimated. It has doubtless resulted in the saving of many lives and much valuable property.

The rules and precepts promulgated by the Bureau are being ably carried out by the various state departments of mines, so that it is not possible today for a dangerous mine to go on using a dangerous class of explosive for any length of time.

A deflagrating explosive is merely a material which burns rapidly, or oxidizes. The slowest example of oxidation is the rusting of iron. Another is the burning of coal or wood. In this process the carbon in the wood or coal combines with the oxygen of the air to form carbon-dioxide gas, and in so doing evolves heat. Deflagrating explosives are merely carbon- and oxygen-producing materials mixed in such a way that when combustion is started it proceeds rapidly and produces a large volume of gas. This in turn exerts pressure or force on the material in which it is confined. Detonating explosives, to which class the permissibles belong, do not burn, but detonate through the rupture of their molecular structure.

Explosives differ materially in rate of combustion, or rate of detonation, and by this we are able to judge with some degree of intelligence what a given explosive will probably do in a certain kind of coal or in a certain class of work.

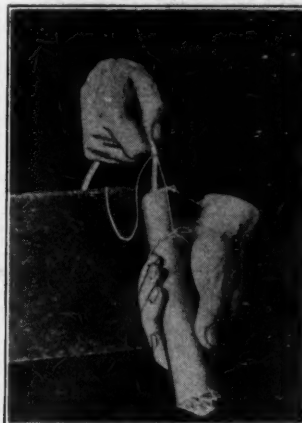
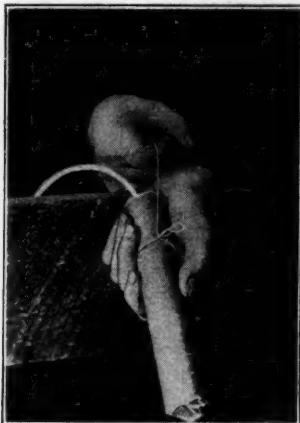
Since all explosives produce both flame and heat when exploded or detonated, and since a flame of any kind if large enough or in contact with a dangerous gas or dust mixture long enough will ignite the gas or dust, the problem in getting a sat-



PROPER WAY TO REMOVE A CAP FROM THE BOX



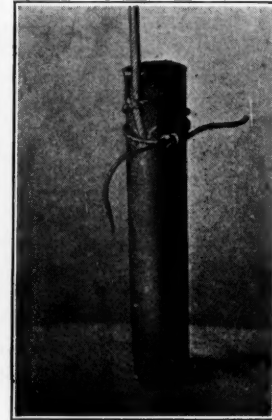
PROPER WAY TO CRIMP A CAP ONTO A FUSE



THREE STEPS IN PRIMING A CARTRIDGE

isfactory permissible is to find one evolving a minimum of flame or a flame of short duration. This is a serious undertaking, for in trying to keep down the flame it is quite probable that the kick in the explosive will also

be kept down. Thanks to the Bureau of Mines we need not dwell on this phase of the situation. Suffice it to say that any permissible explosive on the latest list published by the Bureau of Mines has satisfactorily passed its tests and can be used in dangerous mines, provided the charge limit and all safety practices are observed.



ANOTHER METHOD OF PREPARING A CARTRIDGE

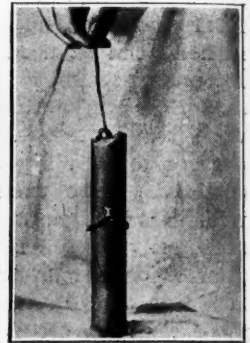
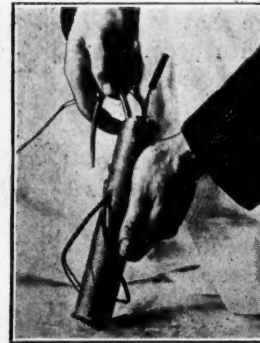
No. 6, No. 7, or No. 8 strength and proper composition as the case may be.

3. That explosives if frozen shall be thoroughly thawed in a safe and suitable manner before use.

4. That the quantity used for a shot does

not exceed 1½ lb. (680 grams) and that it is properly tamped with clay or other noncombustible stemming.

After an explosive has passed the required test and its brand name has been published in a list of permissible explosives, it is not a permissible explosive if one or more of any of the following conditions prevail:



DIFFERENT STEPS IN PRIMING WITH AN ELECTRIC DETONATOR

In order to make it clear what these are, I quote here just what precautions and practices, according to the Bureau of Mines, must be observed with permissible explosives in order to keep them permissible. Otherwise they are no more permissible than 40 per cent. nitro-glycerin dynamite or ordinary black powder.

1. That the explosive must be in all respects similar to the sample submitted by the manufacturer for test.

2. That detonators—preferably electric detonators—are used of not less efficiency than those prescribed—

1. If kept in a moist place until it undergoes a change in character or chemical composition.

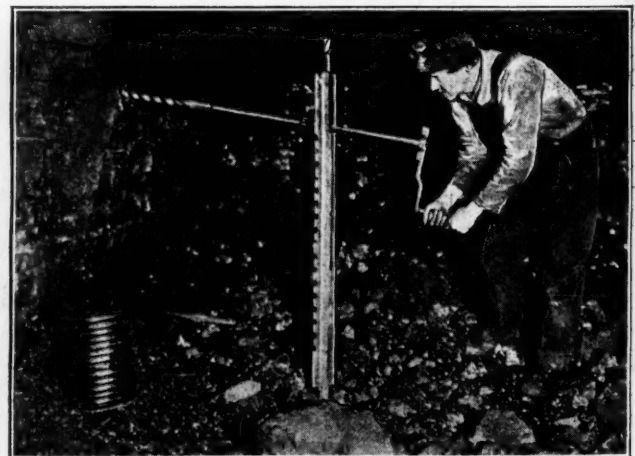
2. If used in a frozen or partly frozen condition.

3. If used in excess of 1½ lb. (680 grams) per shot.

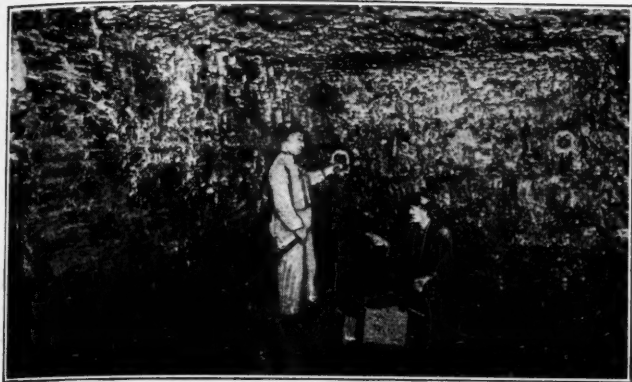
4. If the diameter of the cartridge is less than that designated in the column of report headed "Smallest Permissible Diameter."

5. If fired with a detonator or electric detonator of less efficiency than that described.

6. If fired without stemming.



ILLUSTRATING TWO GENERALLY FOLLOWED METHODS OF BORING A SHOTHOLE



LOADING A HOLE WITH PERMISSIBLE EXPLOSIVE

7. If fired with combustible stemming.

Everyone is familiar with the dangerous practices that prevail in handling explosives around coal mines. Perhaps the gravest of these is carelessness in storing and keeping explosives. Even the largest coal companies, those employing safety engineers and taking every precaution to safeguard the lives and health of employees, have a hard time keeping their magazines clean and free from moisture, old stock from accumulating, etc. Right here let me sound a word of caution about storage. Moisture is the enemy of all explosives. When dampness gets into an explosive, its strength goes out. The old military order, "Trust in God and keep your powder dry," is still applicable, and especially to the man delving deep in the earth for coal.

DANGER WHEN EXPLOSIVES BECOME DAMP

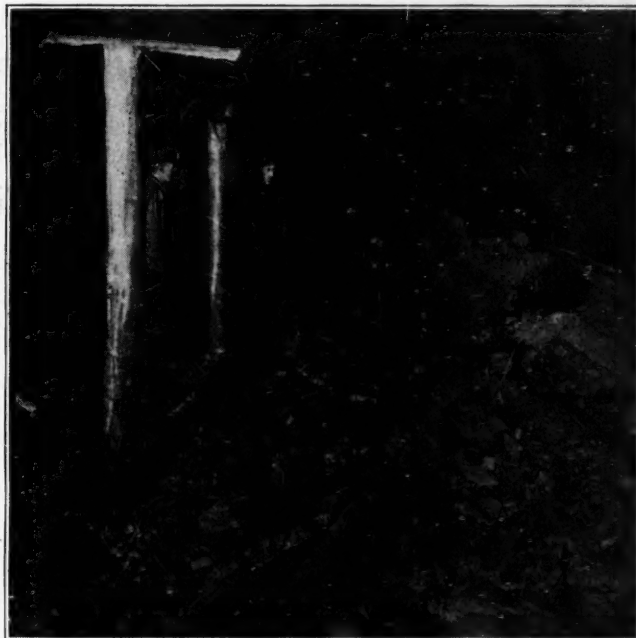
The Bureau of Mines, as stated before, says that a permissible explosive is not a permissible explosive when it gets damp or takes up moisture from the air and undergoes a change. I would particularly warn all coal operators to watch their magazines and keep them dry and well ventilated, so that dampness will not gather therein.

The use of short fuse in shooting is a positive menace. Permissibles are not permissibles when so used. Explosive force is wasted by not properly confining the charge; furthermore, grave danger of igniting the inflammable coal dust is thus incurred to say nothing of the peril from premature explosions.

It is no wonder that accidents occur in the use of

explosives; the marvel is that a great many more do not occur because of carelessness. Familiarity breeds contempt. This is particularly true of explosives. The first time a man crimps a cap onto a piece of fuse he does it very carefully and gingerly with a good crimper; but after performing this operation a few hundred times, and the crimper gets lost or mislaid, he crimps the cap on with his teeth. Should an ordinary No. 6 cap explode during such a procedure, it would surely kill the man instantly; yet he takes the risk time after time. I do not know of a better way to correct these dangerous practices than constant vigilance and patient, persistent effort with the men to keep the danger arising from carelessness constantly before them. Only in this way will fatalities be avoided.

In selecting the proper permissible for a mine many things must be considered, among these might be mentioned: Is the coal soft, medium or hard? Is it brittle, tough and tenacious, or does it crumble and disintegrate to slack easily? Is the bed thin or thick? Is there a good roof or a poor one? Has the coal a parting, and



RESULT OF GOOD SHOOTING



LOADING OUT THE RESULT OF A SHOT

where in the vein is it located? Is it desirable to produce lump coal for the domestic trade, or is the coal used for cooking or steam purposes? Is it machine-cut or pick-mined?

There is a permissible explosive for almost any given condition or purpose, but as a general rule, after considering all the foregoing conditions and picking the explosive which will do the best work under the conditions present, it is necessary to proceed cautiously until the proper grade is obtained or the explosive used to the best possible advantage.

Even the best possible grade of permissible explosives for any particular work may be considered a failure unless used intelligently; that is, unless boreholes are properly placed or properly pointed, the undercut well cleaned out, the charge neither overloaded nor underloaded.

It is really an art to shoot coal properly and economically, but it can be mastered by anyone who will give the matter conscientious study and care.

Importance of Safety in Mining and Metallurgical Industries*

BY W. B. PLANK
U. S. Bureau of Mines

SYNOPSIS—*Accidents in the mines and industries of the southern Appalachian district have been largely reduced during past years. Improvement is decidedly possible. If further accident curtailment is to be effected there must be: The establishment of safety departments; a greater coöperation between employer and employee; continued training in first-aid and mine-rescue work.*

DURING the past few years the progress that has been made by the industries of our country has been marked not only by the rapid increase in the value of their production and the immense capital invested, but also by the attention paid to safeguarding the health and lives of the workmen. This has been true to a marked degree in the mining and metallurgical industries, which employ nearly three million men, through whose labor our national wealth is increased annually over six billion dollars.

At first there was some doubt regarding the permanency of a movement that had its inspiration in human welfare and for its prime purpose the safeguarding of life and limb. However, the experimental stage is passed and now it is the exception rather than the rule to find indifference to safety. Many mining companies and steel plants have been quick to adopt the more desirable safety measures, such as creating safety departments and requiring more careful supervision of their plants. Mining laws have been greatly improved and more strictly enforced. Various local and national organizations have been formed for promoting safety and standardizing methods. The enactment by several states of workmen's compensation legislation, with the consequent insurance against casualties, has aided the safety movement. Much stress is now being laid on the vocational education of industrial workers. More and more attention is being given to this movement, and it has undoubtedly been the means of saving many lives.

It is the purpose of this article to point out a few reasons why this safety movement should be continued, with especial reference to the promotion of first-aid and mine-rescue training in the mines of Alabama. No attempt is made to make the paper exhaustive, but it is hoped that it will be a means of stimulating interest in this humanitarian work.

The reports of fatalities in the mineral industries of the United States, in so far as data exist, show that for the past ten years, excepting the year 1917, the fatality rate in coal mining was higher than that in any other of the different mineral industries. In 1917, the year of our latest complete data, the fatality rate per thousand 300-day workers in the coal mines was

4.25, metal mines 4.44, coke ovens 2.14, ore dressing 1.93, quarries 1.83 and smelting 1.05. For purposes of comparison these figures are stated in terms of one thousand 300-day workers, thus taking into consideration the time element and equating all labor to a 300-day basis.

Fig. 1 shows the comparison of fatality rates in the different mineral industries for the period 1907 to 1917 inclusive. No data exist showing the rates for metal mines and quarries prior to 1911, nor for coke ovens, ore dressing and smelting before 1913. It is worthy of note that, while the coal-mine fatality rate has been consistently higher than the rate in other branches of the mining industry, with the exception previously stated, there has been a steady drop in the curve from 6.19 fatalities per thousand 300-day workers in 1907 to 4.25 in 1917. The number of fatalities in metal mines rose to 852 in 1917, a figure higher than was reached in any of the preceding six years. It is interesting to note also that the total coal-mine fatalities for 1917 show an increase over those for the three preceding years.

In 1918, 2579 men were killed in the coal mines of this country. This was a reduction of 117, or 4.5 per

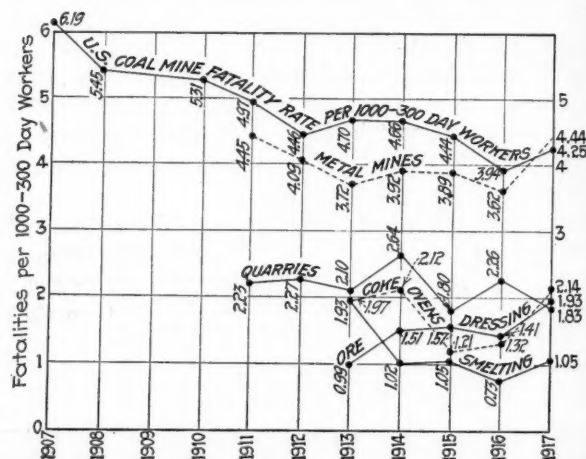


FIG. 1. COMPARISON OF FATALITY RATES IN MINING

cent., as compared with 1917. This reduction is all the more gratifying when we consider that during the larger part of the year the coal mines were under the strain of a maximum production on account of the war. It is estimated that in 1918 a total of 685,300,000 tons of coal were produced as compared with 651,402,374 tons in 1917. This is an increase of 6 per cent. in production. Also the production per fatality was the largest on record, being 266,000 tons in 1918 as compared with 241,600 tons in 1917.

In the State of Alabama 110 men were killed in and about the coal mines in the year 1918 as compared with 108 in 1917. In the coal mines of the southern Appalachian district, consisting of the states of Alabama, Tennessee, Kentucky, Georgia and North Carolina, there were 203 fatalities in 1918 as compared with 279

*Paper read before a meeting of the Alabama Safety Association, Birmingham, Ala., Apr. 19, 1919, and here published by permission of the director of the Bureau of Mines.

in 1917. This was an increase of 2 per cent. for Alabama and a reduction of 27 per cent. for the southern district. Final figures on the coal production are not yet available, but it is estimated that Alabama produced about 18,000,000 tons in 1918, and the southern district 50,000,000 tons as compared with 20,068,074 tons in Alabama and 54,189,314 tons in the southern district for 1917. These figures show a decrease of production in both cases.

Fig. 2 shows graphically the tonnage of coal produced and the total fatalities in Alabama as compared with the whole southern district. In 1917, the year of the latest complete available data, it is seen that Alabama contributed 108 out of a total of 279 fatalities for the southern district, or 40 per cent., as compared with 37 per cent. of the total coal production for the district. In other words, in 1917 there were 5.38 fatalities in Alabama per 1,000,000 tons of coal produced as compared with 5.15 for the whole southern district.

For the purpose of making a just comparison between the fatality rates in Alabama and the entire southern district, by taking into account the number of employees and the hours worked, Fig. 3 has been prepared in order to show the fatality rates per thousand 2000-hour employees in both cases. We see by studying this figure that this rate for Alabama has been consistently higher than the rate for the district as a whole over the 11-year period from 1907 to 1917, with the exception of the years 1915 and 1917, when it was slightly less. The exceptions may be explained by the fact that in the year 1915 the total number of fatalities in Alabama and in the southern district were the lowest during the period shown, because of a marked inactivity in the coal trade. In 1917 there was an increase of nearly 25 per cent. over 1916 in the fatalities in the entire district, arising mostly from a mine disaster in Kentucky, whereas in Alabama there was a reduction of nearly 10 per cent. from the fatalities of 1916.

It is worthy of note that for the year 1917 there were 2.9 fatalities per thousand 2000-hour workers in Alabama as compared with 3.44 in the whole district; but when we consider only the number of employees, leaving out the time element, we find there were 3.9 fatalities per 1000 employees in Alabama and only 3.77 for the entire district. This difference may be explained by the fact that in 1917 the coal mines of Alabama worked longer hours than the rest of the region in an effort to increase the production of coal and thus respond to the widespread appeal for the fuel needed to supply the country's war necessities.

The foregoing statistics indicate that for the country as a whole there has been a concerted effort on the part of the mining industry to lessen fatalities. This is indeed creditable when we consider the abnormal conditions under which coal mines operated during the past two years. The demand for coal was unprecedented and many of the experienced miners and officials either enlisted or were drafted into the army. There was a marked dearth of young men about the mines, their places being filled by older and, in some cases, by less experienced men. From the standpoint of labor the conditions under which the mines were operated were not favorable to a reduction in the number of accidents.

On the other hand, however, as far as possible, the mines were operated on a full-time basis, which tended to reduce the hazard from certain dangers such as ex-

plosions of gas and dust, and falls of roof. A mine working full time is likely to be kept in better condition than one working only part time.

By carefully examining the fatality records of mining, and especially those of coal mining, we find that a large percentage of the fatalities can be attributed to what are called preventable or avoidable accidents. They comprise accidents by falls of rock and coal, by cars and locomotives, gas and dust explosions, and many others which have too often been ascribed to the hazards of the industry.

For the purpose of showing more clearly the large percentage of preventable accidents which occur in our coal mines Fig. 4 has been prepared, to show graphically the different causes of the fatalities in the Alabama coal mines for 1918. It will be seen by examining this

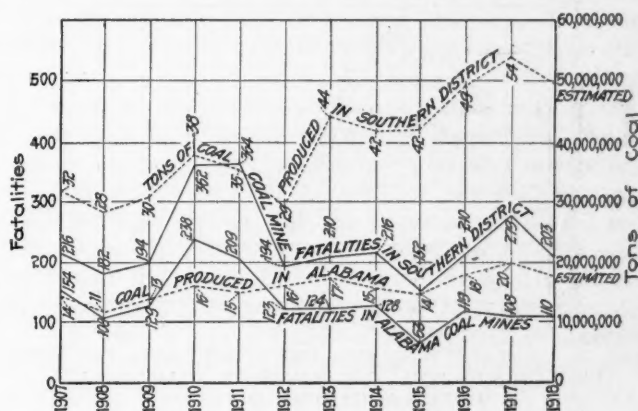


FIG. 2. FATALITIES AND TONS OF COAL PRODUCED IN SOUTHERN DISTRICT COMPARED WITH ALABAMA

chart that falls of rock and coal, cars, and explosions were responsible for 80 per cent. of the total fatalities.

A matter to which we should all give earnest consideration is that the great majority of this 80 per cent. of the coal-mine fatalities in Alabama were preventable, and they would not have occurred except for carelessness, inexperience, poor inspection, unsafe practices, ignorance, indifference, lack of coöperation between employer and employee, violations of orders or instructions, defective equipment, poor lighting, lack of proper safeguards, poor judgment and other indirect causes. The elimination of all these things, which are responsible for most of our preventable accidents, is the aim of the safety movement. Is it necessary, therefore, to raise the question of the importance of continuing this movement with more vigor than ever before, when we see what a great field of endeavor there is before us in trying to do away with this high percentage of preventable accidents? In view of the wonderful attainments of the safety movement in the past few years, during which time the hazards of the mining industries have been greatly reduced, we are bound to conclude that even more wonderful accomplishments will result in the future if we continue to make safety the first consideration.

Let us now direct our attention to a brief discussion of some of the agencies through which safety is being successfully promoted.

H. M. Wilson and J. R. Fleming, in their excellent paper on "Safety Work in Mines," published as Technical Paper 103 of the United States Bureau of Mines, classify under three heads all the different factors entering into successful safety promotion, as follows:

1. An organization that provides an enthusiastic safety committee or department, an adequate inspection system and hearty coöperation of officials and employees.

2. A scheme of safety measures designed to eliminate as far as possible dangerous conditions that have caused accidents or may cause them.

3. A system of education that will assist all employees to follow more carefully the safe and proper methods of work and will keep them constantly alert to the need of caution.

Before any progress can be made in a safety campaign there must be created a well organized and efficient safety department thoroughly imbued with the importance of preventing accidents. Such an organization should receive its inspiration from the highest officials

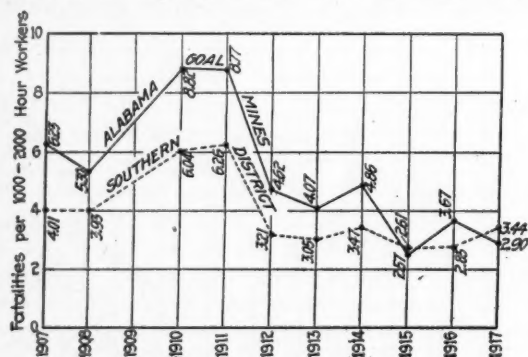


FIG. 2. FATALITY RATES PER THOUSAND 2000-HOUR WORKERS IN THE COAL MINES OF ALABAMA AND OF THE SOUTHERN DISTRICT

in the company, who must show, by their willingness to allot ample funds, that the company is firmly behind the work. We are pleased to note that much progress has been made in this direction during the past few years in Alabama. Several large coal and steel industries have created efficient safety and inspection departments, and the results already obtained have warranted the expenditure of the money and time that the work has needed. I have been told that for the first two years after the creation of a safety department by one of Alabama's coal and iron corporations there was not one fatality in its coal mines. Many other examples might be cited of the actual saving, not only in lives but in money, attained by an earnest effort at safety organization.

ONE PHASE OF AN INSPECTOR'S WORK

I desire to make only one observation concerning one phase of the safety inspector's work. The safety inspector is the one man in the safety organization who can and will become the missing link between the employer and the employee by removing the impersonal relationship which so often exists between the company and the worker, and by promoting that highly essential spirit of coöperation which is absolutely necessary to the successful prosecution of all reforms in operating practice looking to further safety. To the operator belongs the duty of initiating safety practices; but, unless the coöperation of the employee is sought, quite often the efforts of the operator in this regard are in vain.

It is often said that the miner is unappreciative of the efforts put forth by the operator toward making his work less hazardous, but frequently this attitude is caused by the apparent reluctance or indifference on the part of the operator to take the miner into his confidence and point out to him just why and how a pro-

posed safety measure will benefit him. Is it not true that men who risk their lives to save those of their fellows will be willing to help better working conditions when they are approached about the matter in the right way? There should be an ever-increasing spirit of coöperation on the part of both the operator and the miner, and if the matter is handled in the right way by an efficient safety inspector the miner will be only too ready to respond.

The increasing production of the mines and plants is made possible only by the increasing use of labor-saving machinery and appliances. This has made the hazards from these appliances larger than ever before, and a goodly number of the injuries and fatal accidents are caused by machinery of one kind or another. Manifestly, then, it is incumbent upon safety departments to provide sufficient mechanical safeguards and safety apparatus and appliances.

Under this head may be mentioned the free use of danger and direction signs in and around the mines, providing sufficient timbering as a safety precaution even where good roof conditions may exist, properly insulating and guarding electric wires, providing sufficient ventilation to prevent gas accumulations, eliminating or immunizing coal dust, using permissible explosives, permissible coal-cutting machines and permissible electric cap lamps, and other safety appliances that most up-to-date mines are now using. The widespread adoption of these approved safety appliances in coal mines will go a long way toward eliminating a large number of preventable accidents both fatal and nonfatal.

Many examples may be cited of what has already been accomplished along this line, but I will present only one notable instance. A large coal-mining company in Illinois, which is always among the first to adopt approved safety appliances, recently installed permissible electric cap lamps in one of its mines where open lamps had been previously used. It found, after the installa-

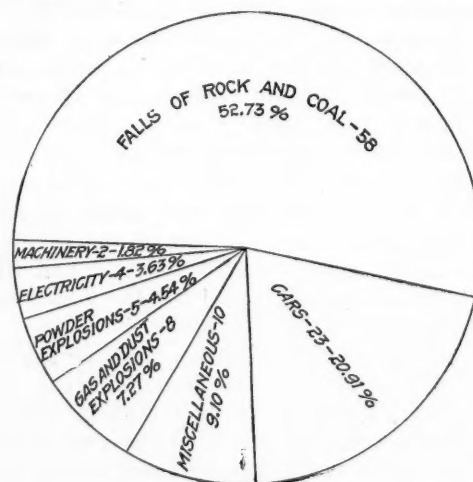


FIG. 4. COAL MINE FATALITIES IN ALABAMA IN 1918, BY CAUSES

tion of the electric lamps, that the number of injuries per employee fell below, not only the previous record at that mine, but also below the record for its five other mines where open lights were still being used. The greatest reduction was in the number of small injuries from loading coal at the face, such as cuts and bruises and eye accidents caused by falls of coal and the like. Fewer injuries, moreover, were sustained from mine cars.

I have discussed briefly some of the agencies that have caused a reduction in the number of fatalities by preventing the occurrence of accidents. Let us now direct our attention to one phase of the educational feature in connection with the safety movement which reduces fatalities after the accidents occur. I refer to the first-aid-to-the-injured and the mine-rescue work which is being conducted by the safety department of a number of large mining companies, the American Red Cross, the Public Health Service and by the United States Bureau of Mines.

We can nearly all remember the time when a miner, overcome by gas or rendered unconscious from an electric shock, was placed to one side, an object of helpless pity, to await the arrival of the doctor. We probably know of instances where men working about a blast furnace have been overcome and probably killed by carbon monoxide, because there was no breathing apparatus for them to wear, or no one knew how to administer artificial respiration. We know of cases where men have bled to death after receiving an injury because their comrades did not know how to control hemorrhage. Too often in the past the injured about the mines and industrial plants have suffered untold agonies before they could be taken to the doctor or hospital, all because their comrades did not know some of the simple rules for relieving pain and suffering that can be learned so easily.

Happily, such instances occur rarely in our mineral industries today, because during the past few years first-aid and mine-rescue training for miners has been carried on quite vigorously in all the mining regions of the country. This training work undoubtedly has done much toward minimizing fatalities by preventing simple accidents from becoming fatal through ignorance and lack of proper first-aid attention. It has made more efficient workers by causing the men to be more careful of their own and their buddy's safety. It has caused the companies to take a more lively interest in safety when they have seen that efforts in that direction have been appreciated by their employees. It has proved a matter of economy to the companies by lessening liability insurance rates in those states where workmen's compensation laws are in effect.

RELATION BETWEEN FATALITIES AND SAFETY WORK

Let us now look into the relation between the fatalities in the coal mines of Alabama and the progress of the first-aid and mine-rescue work that has been carried on in the state by the Bureau of Mines and other organizations since 1911. Fig. 5 shows graphically the number of fatalities in the Alabama coal mines as compared with the number of men trained in first aid and mine rescue from 1911 to 1918 inclusive. The data for this figure were obtained from the annual reports of the Director of the Bureau of Mines and from the Alabama state mine inspectors' reports. It might be said that the number of men trained, as shown by this figure, includes those trained by other organizations, but who were later examined by an employee of the Bureau to receive Bureau of Mines certificates. This is in line with the bureau's policy of coöperation with state and company organizations in training work.

In examining this figure, it will be plainly noted that as the number of men trained increased from 32 in 1911 to 592 in 1915, the number of fatalities fell from

209 in 1911 to 63 in 1915. It is noteworthy that in 1915, when the largest number of men were trained, there were only 63 fatalities—the best record for ten years. This was also the year of the first state-wide first-aid contest held in Alabama, and undoubtedly the impetus which the safety movement received through this contest was responsible to a large degree for the good fatality record for 1915.

For the past two years there has been a marked falling off in the training work in Alabama. This may be attributed largely to the war, which made large production of the utmost importance. Also the Bureau of Mines has been handicapped in its training work in this state during the past year on account of the destruction, by a wreck a year ago, of the Mine Rescue Truck No. 1. I am pleased to say, however, that the truck has been rebuilt and put back in service, and a full training itinerary is now being followed by Foreman Miner J. M. Cobb.

With the present limitations in funds and personnel, it is manifestly impossible for the Bureau of Mines to cover thoroughly the many mining fields of the country; consequently, the aim has been to stimulate the mine safety and training work as much as possible by example, and to seek the coöperation and support of all agencies working for the same ends. In its effort to promote the health and safety of workers in the mineral industries, the Bureau of Mines welcomes the coöperation of operators' and workmen's organizations, of

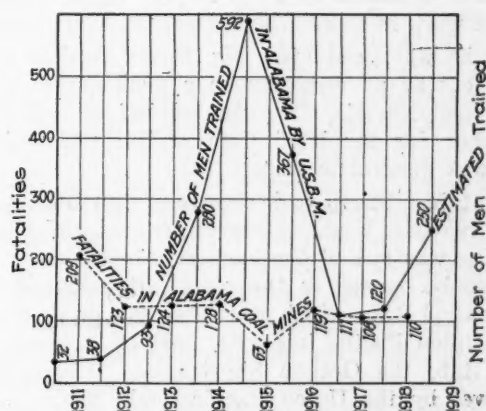


FIG. 5. MEN TRAINED IN FIRST AID AND RESCUE WORK AND MINE FATALITIES IN ALABAMA, 1911 TO 1918

technical societies and safety associations and of state officials and state governments.

Much has been done in the past in the State of Alabama, but there is still more to be done. Now that the war is over and our mines and plants are getting back to a peace-time basis, we should take up this first-aid and mine-rescue work with renewed energy so that there may be a further reduction in the number of fatal accidents.

In conclusion, then, if we are to reduce further the number of accidents in our mining and metallurgical industries, we must, first of all, establish permanent and efficient safety departments; there must be an ever-increasing spirit of coöperation between the employer and the employee, because the success of all safety movements depends thereon; we must not relax our efforts in furthering the first-aid and mine-rescue training which has already proved so beneficial in lessening accidents.

William Gibson Sharp

AN OBITUARY

IN THE death of W. G. Sharp, president of the United States Smelting, Refining and Mining

Co., which occurred as the result of heart failure at his home in Boston, Mass., on July 1, 1919, the mining industry lost one who for more than thirty years had blazed trails for others to follow. Some may ask in what manner Mr. Sharp's achievements affected the coal industry; and as he had not been directly connected with coal mining for some years, his early achievements have probably been forgotten except by the older generation. He was, however, essentially a coal miner, and the best years of his life were devoted to the coal-mining industry and to the solving of its problems.

Mr. Sharp was born in Salt Lake City, Utah, on Mar. 17, 1857. His parents were John and Anne Gibson Sharp. His early education was obtained in the public schools of Salt Lake City and later in Rensselaer Polytechnic Institute at Troy, N. Y. He also did post-graduate work at Columbia University, New York City.

After he was graduated, Mr. Sharp worked for the Government as an engineer on a geological survey in Arizona and Nevada. He also worked at one time as telegrapher for the Utah Central R.R., of which his father was general manager.

In 1881 Mr. Sharp took charge of the Utah Central mine at Scofield, Utah, as superintendent and engineer. This mine was one of the earliest mines of any consequence to be opened in the state. It belonged to the Utah Central R.R., which was later sold to or absorbed by the Union Pacific interests, part of it being incorporated into the Oregon Short Line. The mine was taken over by the Union Pacific Coal Company.

In 1883 or 1885 Mr. Sharp took charge of the Winter Quarters Mine of the Pleasant Valley Coal Co., with title of superintendent. This mine was the property of Palmer and Dodge, who at that time controlled the Rio Grande Western R.R. On the sale of the Rio Grande Western R.R. to the Denver & Rio Grande, the Pleasant Valley Coal Co. passed into other hands and became the nucleus of the Utah Fuel Co., which company was practically developed to its present state during Mr. Sharp's administration of its affairs. He opened up and placed on an operating basis the mine at Castle Gate, Utah, in 1889. Mines at Clear Creek and Sunnyside, Utah, were also opened by him in 1899, and the mine at Somerset, Colo., was planned during his administration. Active development, however, did not begin until after Mr. Sharp had severed his connection.

Mr. Sharp's greatest service to the coal-mining industry of Utah and to the country at large consisted in his broadminded attitude toward sociolog-

ical and safety measures. He was far in advance of the times, and many years before the Bureau of Mines came

into being Mr. Sharp was instrumental in the inception of safety devices, which have since been incorporated into general mining practice. Many of the improvements which he or his organization worked out have been rediscovered in other districts, where they have been hailed as innovations or as original ideas. Historical data, however, establish the fact beyond fear of contravention that Mr. Sharp's trained mind was the first to realize the necessity for certain preventive measures, which were adopted in Utah in the early '90s. Most of these measures have since been looked upon as good practice in the State of Utah and have been adopted by all mining companies, either as a result of statutory mandate or by force of public opinion.

One of the notable improvements was the substitution of dynamite (Hercules No. 2) in place of black powder, which occurred at the Castle Gate mine about May, 1890. It should be said here that this was many years before permissible powder was thought of. Practically all of the mines in the State of Utah use permissible explosives at this time.

Early in 1890 the use of wood pulp for tamping was inaugurated. It is probable that the late Robert Forrester, one of Mr. Sharp's loyal subordinates, assisted him with this, as well as with the inauguration of other safeguards. The use of wood pulp was probably adopted due to their search for tamping material similar in its characteristics to the wet moss which at that time was used in Scotland. Wood pulp is no longer used for tamping, but at the early date at which it was introduced it was certainly an innovation of more than ordinary merit.

In 1891 the first sprinkling system was installed at the Castle Gate operation. Pipes were laid throughout the mine, which were equipped with bibbs at convenient intervals, and men were employed to wash down the roof, ribs and floor, using a $\frac{1}{2}$ -in. hose, which permitted easy access to crosscuts and all other working places.

At about the same time that the sprinkling system was installed, the humidification of the intake air was begun by the admission into the mine of exhaust steam, which was augmented by a percentage of live steam from the power plant.

In 1891 an electric shotfiring system was installed at Castle Gate. By this system all shots were fired from the outside after all employees were out of the mine. A description of the system used today in practically all of the mines in Utah has appeared in *Coal Age* within the past three or four years, the methods in use today

being substantially the same as those adopted in the beginning. It was during Mr. Sharp's connection in Utah that the first coke ovens were built at Castle Gate in 1889. These ovens made the first coke which had been produced in the state for commercial quantities up to that time.

Although in the beginning Mr. Sharp's title was that of superintendent, his duties and responsibilities gave him a much wider authority than the title would imply. However, in either 1890 or 1891 he was made general manager of the Pleasant Valley Coal Co., which position he occupied until he left Utah in 1901, to accept the position as manager of sales for the Consolidation Coal Co., with headquarters in New York City. His ability was of such high order that upon the formation of the United States Smelting, Refining and Mining Co. in 1905, his services were solicited by the interests in charge. He remained with this company as its president until his death, and his qualifications as an executive here developed their broadest scope.

Through his efforts, coupled with the loyal support of his associates and of the subordinates in the organization which he built up, all of whom deemed it a privilege to work for him, he acquired and developed many valuable properties, those of particular note being the Real Del Monte mines in the Pachuca district of Mexico, and several other valuable metal-mining and smelting plants. The properties that he developed, which are of particular interest to the coal-mining industry, being the United States Fuel Co. and the Utah Ry., both located in the State of Utah.

Mr. Sharp's early experience in the West had given him a most intimate knowledge of the possibilities of a section which is little known and less understood by the average easterner. He visualized the country as it would be in the years to come, and foresaw the opportunity of building up the coal-mining industry upon a scale and according to a standard which had not been attempted theretofore. Consequently, in 1912 he acquired for his company several large producing coal mines in the State of Utah, which had been opened up and developed a year or two before, these properties being the Castle Valley Coal Co., the Black Hawk Coal Co. and the Consolidated Fuel Co. A little later he purchased the Panther Mine, an undeveloped property located near Castle Gate, Utah. These plants were operated for two or three years as separate companies, but as soon as possible a consolidation was effected and they were all combined into what is now the United States Fuel Company.

The first three mentioned mines were served by two small railroads which connected with the main line of the Denver & Rio Grande at Price, Utah. The grades and curves on these railroads were of such character that their operation was both difficult and expensive; consequently, it was decided that in order to solve the difficulty an entirely new line would have to be constructed. Numerous surveys were made, which resulted finally in the construction of the Utah Ry., which was opened to traffic in 1914. This line gives the mines of the United States Fuel Co. and others built tributary to it direct connection with the Salt Lake Route and the Denver & Rio Grande R.R. at Provo, Utah. The rolling stock and motive power are of the best, and it frequently happens that a car of coal is delivered in Salt Lake City before the bill of lading, which was mailed the same day, reaches the consignee. Since this road has been operated by the owners the mines located on its line have received 100 per cent. service.

Mr. Sharp always insisted that the safety and welfare of the company's employees and their families be given paramount consideration, consequently no amount of money or care has been left unexpended in the effort to make the properties of the United States Fuel Co. modern and safe in every sense of the word. Housing facilities are far better than the average, and an effort has been made to beautify the surroundings. An emergency hospital, capable of caring for twenty patients, has been constructed. Smaller

emergency hospitals are located at or near the mines of the several plants. Amusement halls, or community buildings, have been constructed at several of the plants, and a bath, or change house, has been constructed at one of the mines. Others are planned and will be erected as soon as possible. The imprint of the master mind is plainly discernible.

Not the least of Mr. Sharp's qualifications was his ability as an organizer. In the early days his relationship to his employees was intimate, and men worked for him from a spirit of personal loyalty, which is difficult to duplicate at this time. He was known to a host of oldtime Scotch, Welsh and English miners as "Wull" Sharp. This freedom of speech, instead of being looked upon as an impertinence, was considered by Mr. Sharp as an honor. He took a great interest in his employees and their families, and especially in the welfare of the young men in his organization, and many a successful man in the West today can attribute his success either to early training obtained in Mr. Sharp's organization or to assistance and advice rendered in later life.

A Problem in Coal Extraction

SYNOPSIS—*In one of the important coal fields the extraction varies from 40 to 50 per cent. The mining conditions and present practice are here detailed, and discussion is invited with a view to the development and adoption of methods that will permit better recovery.*

THE accompanying illustration shows a method of mining used in one of the important mining fields in the United States by which only about 50 per cent. of the coal in the ground is obtained. It is recognized that a high percentage of recovery is desirable and probably can be secured by a change in method, although the conditions as outlined are difficult. The readers of *Coal Age* are asked to criticize the plan illustrated and to suggest a better method of operation.

The depth of the coal ranges from 450 to 600 ft. The bed worked is 8½ to 11 ft. thick, and the top and bottom of the seam is hard coal. A middle layer is softer and rashes easily. The top coal, 1½ to 3 ft. thick, is left up to protect the shale roof. It separates easily from the under coal and also from the overlying rock, so that it can be easily recovered later if other conditions permit. A hard siliceous shale "blue-band" occurs 1½ to 3 ft. from the bottom and is 1½ in. thick, occasionally thicker. Mining is done in the bottom coal.

The bulk of the overlying hard rock is a siliceous shale that disintegrates when exposed to the air and falls readily either in irregular slabs of considerable size, in small pieces or, occasionally, in extremely large masses which break off along fairly distinct cleavage planes. In some cases this broken material chokes and there is no evidence of subsidence on the surface; but when large areas squeeze, cracks and subsidence are evident at the surface.

The top coal and the overlying shale contain indistinct cleavage planes which extend approximately north and south. Along these planes the top coal and shale roof cut upward easily when exposed to the air, sometimes arching at a height of 4 to 10 ft. above the coal and sometimes breaking irregularly for an indeterminate distance upward. Slip faults are abundant in the top rock and occasionally extend down through the top coal, or less frequently through the whole bed. The general direction of these slips is north and south with an inclination of 35 to 40 deg. from the vertical.

About 40 ft. above the coal is limestone, generally about 4 ft. thick, but of variable thickness. It occasionally lies directly on the coal or it may be as high as 100 ft. above it. Sometimes it is entirely absent. Occasionally other limestone beds occur at a higher elevation, but such beds are not

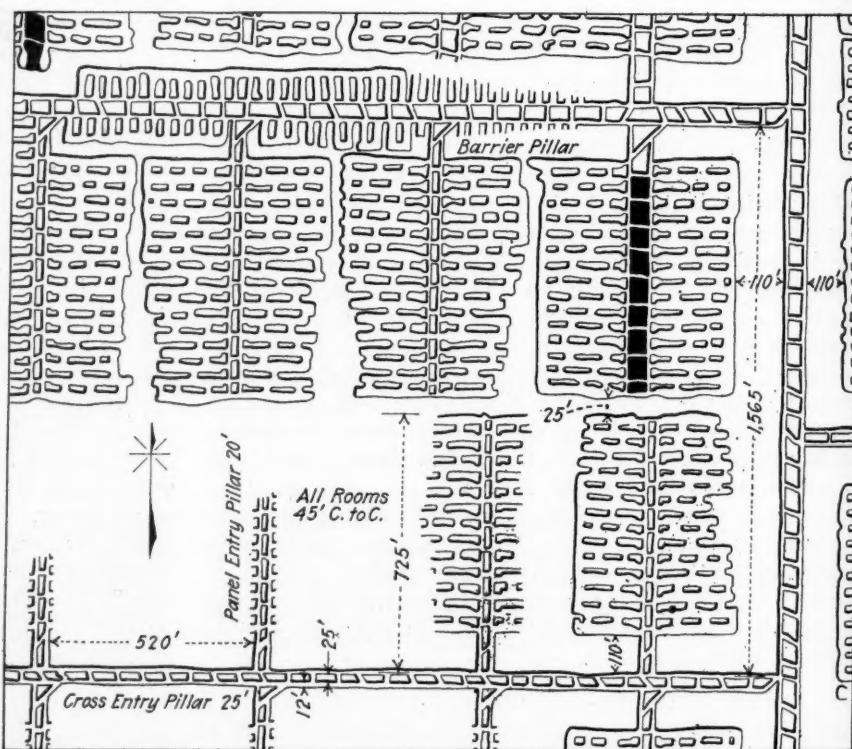
persistent over large areas. Near the surface the drift material consists of clay and sand varying in thickness up to 100 ft.

Fireclay, which varies from a few inches to several feet, and which disintegrates when exposed to moisture and air, forms the bottom of the coal bed. This material will thus crack and heave even in crosscuts.

A modified panel system is used in mining (see accompanying diagram). Rooms are on 45-ft. centers, and for the first 100 ft. are driven 18 to 21 ft. wide. Inside this point they are gradually widened to a width of 28 to 30 ft. at the face, leaving pillars 19 to 25 ft. wide. Crosscuts are 60 ft. apart. Room entries are 725 ft. long and 12 ft. wide, with a 20-ft. pillar between. Barrier pillars are 100 to 125 ft. wide, and 14 rooms are driven off each entry, this number accommodating one breast machine for each panel. Rooms are necked when the entries are driven, the width of the neck being 18 ft., which is the minimum width without yardage charge. All the rooms on a panel are started at the same time when the entry is finished and are widened to full width of 24 ft. in four machine cuts.

It takes about one year to drive a panel entry and about another year to drive the rooms therefrom, so that each panel is completed in approximately two years. Rooms are driven east and west on account of roof conditions, as the roof falls more readily in openings driven north and south because of the cleavage in the top coal and shale.

After the rooms are driven their full length, a wide crosscut is driven along the entire face of the panel, and then, if possible, pillars are robbed with solid shooting by intermediate crosscuts through the pillars. The track is pulled back to the entry when there is any



PLAN OF UNDERGROUND WORKINGS, SHOWING METHOD OF OPERATION

evidence of a squeeze. If conditions permit, the room stumps and entry pillars are slabbed to a depth of one machine cut. Wide barrier pillars are robbed, as shown in the diagram, by means of rooms.

Squeezes usually follow the extraction of 40 to 50 per cent. of the coal, and the resulting subsidence is often evident at the surface. In case of squeezes gas is liberated in quite large amounts, but frequently it is not observable on the cross entry adjoining the squeezing panel until several days after the pillars have crushed, and until the breaking and crushing of the overlying rock is well advanced. Mines are worked with both open and closed lights. Usually the panel squeezes before the room pillars can be secured, and occasionally a squeeze occurs before the rooms are driven full length; a part of the panel may be abandoned temporarily, though frequently the remaining coal can be got from an adjoining panel.

Squeezes give ample warning, so that there are few accidents and little material is lost. They usually occur soon after the rooms have been driven full length, but occasionally pillars hold for a much longer time. The workings are fairly gaseous but dry, and generally no water comes from the workings in case of a squeeze. About 100 props per room are put in along the track, and sometimes in crosscuts. About one-third of these props can be saved if labor conditions make it worth while to do so. Where the surface is not owned in fee, leases usually contain a clause releasing the mining company from liability for surface subsidence.

The field is closely unionized, and according to the agreement there must be a working place for each man; but two men can work together in one room loading, while the other room is being cut. Gangs of six men frequently drive a number of entries, one man acting as machine runner and the others as loaders, but all sharing equally in the pay.

Crosscuts are driven 60 ft. apart as required by state law. Any change of method is difficult owing to labor conditions. Only 14 men can work with one breast machine and only 20 men with a shortwall machine.

All room tracks are laid by the company, and the miner sets his own props at his working face only. Mine cars and explosives are delivered at the roomneck. Permissible powder is used and shotfirers examine the holes and charges before the holes are tamped. They fire all shots. The miners are a mixture of foreign races and generally have had no mining experience before coming to America. The coal is used for steam and domestic purposes, and consequently should contain a minimum of slack and fine material.

Decomposition of Hydrocarbons

The process of decomposition of hydrocarbons is probably a gradual dehydrogenation. Compounds of higher molecular weight are decomposed into compounds of lower molecular weight with liberation of hydrogen or a simple hydrocarbon. These intermediate compounds are in turn decomposed. Some of the products, particularly the carbon, may polymerize to form compounds of higher molecular weight. The decomposition does not follow any single path, but is influenced by the temperature and pressure. The ultimate products are carbon and hydrogen.—*Bureau of Mines Bulletin No. 135.*

Legal Department

SELECTION OF MINE PROPS—An operator is not liable for injury sustained by a miner through breaking of a prop furnished for his use and selected by him from a number of good and bad ones. It is contributory negligence for a miner to continue to use props which he knows to be defective. An employer may relieve himself from responsibility for injuries to his employees by entrusting to them performance of ordinary and simple duties incidental to the employment and resting upon the employees' knowledge and skill. (Kansas City Court of Appeals, *Kube vs. Northwestern Coal and Mining Co.*, 209 Southwestern Reporter, 614.)

WAIVER OF LEASE RIGHTS—AUTHORITY OF CORPORATE OFFICERS—If one holding a coal-mining lease knowingly permits another to purchase the leased property and to make improvements in innocent ignorance of the lessee's rights under the lease—the lessee failing to protest or give notice of his rights—he will not be permitted to assert them against such purchaser. But where the purchaser has actual or constructive knowledge of the lessee's rights the latter's silence will not estop him from asserting them. The vice president and general manager of a coal-mining corporation has no implied authority to dispose of all of its assets. Actual authority to sell a lease for cash confers no authority to bind the company by an agreement to sell for anything less than cash. (Kentucky Court of Appeals, *Empire Coal Mining Co. vs. Empire Coal Co.*, 210 Southwestern Reporter, 474.)

ILLINOIS MINES ACT APPLIED—In the case of *Wendzinski vs. Madison Coal Corporation et al*, 118 Northeastern Reporter, 435, the Illinois Supreme Court has reversed a judgment for \$15,000 awarded by a lower court in favor of plaintiff on account of loss of his eyesight by the explosion of a cartridge while it was about halfway back in a hole 4 ft. deep which he had bored for the purpose of shooting down coal in a mine of the defendant company in which he had employment. The reversed judgment was awarded against the company and its mine manager and assistant mine manager jointly. The main theory on which the suit proceeded was that the defendants were negligent in failing to properly instruct plaintiff concerning the handling of explosives. The principal points decided by the Supreme Court of appeal were as follows: The fact that plaintiff had received a certificate of competency from the miners' examining board was properly considered on the question of fact whether defendants knew or ought to have known that plaintiff was so ignorant of the dangers of handling explosives as to make it proper to instruct him, but the fact was not conclusive against the necessity for such instruction. By electing not to be bound by the provisions of the Illinois Workmen's Compensation Act the defendant coal company lost any right to defend plaintiff's suit on the ground that the injury was caused by his own contributory negligence, or by a risk assumed as an incident to his employment, or by negligence of a fellow servant. But this did not relieve plaintiff of the necessity of establishing negligence on the part of the company directly causing his injury. Nor did it affect the right of the defendant's mine manager and assistant mine manager to interpose the three defenses just mentioned. A general, uniform and well-known custom not to instruct practical miners in the use of explosives might be shown on an issue as to the existence of negligence on the part of the defendants, but would not necessarily excuse failure to give such instruction. The provision of the Illinois Mine and Miners Act, for a right of action in favor of miners injured through violation of the safety provisions of the act by their superiors, applies only to employers, and gives no right of action against the mine managers individually, although a manager may become liable to punishment as for a misdemeanor.

Who's Who in Coal Mining

AMONG the early pioneers whose lives have been spent in the Middle West and whose energy and ambition have assisted in building up the coal industry of that section, none is more worthy of recognition in these pages than our humble and faithful friend James Taylor, formerly state mine inspector in Illinois and now special mining investigator for the Department of Mines and Minerals, Springfield, Ill.

Born in Heywood, Lancashire, England, in 1854, Mr. Taylor is now, at the age of 65 years, as alert and active as a man of forty. In company with his parents he came to this country in 1873, a lad of 19, and located at Elmwood, Peoria County, Ill., where he obtained work in the mines. Three years later, Oct. 10, 1876, he was happily married to Rebecca Seaton Gilyart, of Elmwood, and their union has since been blessed with three sons and three daughters, now all grown to manhood and womanhood.

Mr. Taylor's genial smile and warm sympathy for the distressed and unfortunate has won for him the appellation of "Uncle Jim," by which he is familiarly known in his large circle of acquaintances. To know Jim Taylor is to love him for the generosity of his nature and to respect him for his courage and ability. In 1885, after studying and working in the mines to fit himself for higher service, Mr. Taylor went before the state board of examiners for the second time, having failed to pass the examination the previous year. He was now successful and having obtained his certificate was at once made mine manager (foreman) of the Wantling and Howarth mine at Edwards, Ill., where he was working.

One year later, 1886, Mr. Taylor was honored by Governor Oglesby with an appointment as state mine inspector, for the third district of Illinois, serving in that office continuously till 1907, with the exception of four years, 1892-1896, when he failed of the appointment by Governor Altgeld (democrat), but was reinstated in office in 1896 by Governor Tanner.

It was in the year 1907, after 15 years of service as state mine inspector in Illinois, that Mr. Taylor was chosen and offered the position of general superintendent of the Canada West End Coal Co., operating large mines at Tabor, Alberta, Canada, where he had spent his summer vacation and, on the invitation of J. J. Hill of the Northern Pacific R.R., had inspected and nego-

tiated the purchase of 31,000 acres of coal land, for said company.

The love of home, however, proved stronger than the allurements of that great Canadian coal field, and the following year, 1908, brought Mr. Taylor back to Illinois, at the earnest solicitation of Governor Deneen, to fill the vacancy caused by the resignation of Thomas Hannah, in the Sixth District of the state. Governor Deneen had always regarded Mr. Taylor as one of the best posted mining men in the state and had sent him

to investigate the terrible disaster that occurred in the Leiter mine, at Zeigler, Ill., April 3, 1905, when 53 lives were lost in an explosion of gas in that mine.

At the time of the great disaster in the Cherry mine, Bureau County, Nov. 13, 1909, Mr. Taylor, with other inspectors from the several districts of Illinois and the adjoining states, entered the mine in the hope of rescuing some of the 259 lives sacrificed in that appalling catastrophe. His brother members of Peoria Lodge, No. 20, B. P. O. E., recognized that service by a special presentation commending his participation in that dread event.

In the reorganization of the administrative branch of the Illinois state government, in October, 1917, Mr. Taylor was appointed

special investigator, and charged with the duty of investigating methods and conditions in the coal and metalliferous mines of the state regarding the safety of life and property and the conservation of the natural resources of the state, which position he still holds.

No movement for the betterment of coal-mining conditions either in his home state of Illinois or in other district or sections of the country has ever failed to receive the hearty and unqualified support of Mr. Taylor, whose untiring efforts have more than once been the main stay of disheartened workers in a cause calling for the sacrifice of means, time and effort. No worthy unfortunate one, of whom there are many in the coal-mining industry, has ever failed of his sympathy and help.

In the organization and training of first-aid teams, in mining camps and districts, Mr. Taylor has always manifested a deep interest and played an active part, and Illinois and the coal-mining interests of other states have been inspired by the help and smile of "Uncle Jim" Taylor, who has the heartiest congratulations of *Coal Age*. May he long live and prosper.



JAMES TAYLOR

New Type of Mine Bonds

BY E. STECK
Hillsboro, Ill.

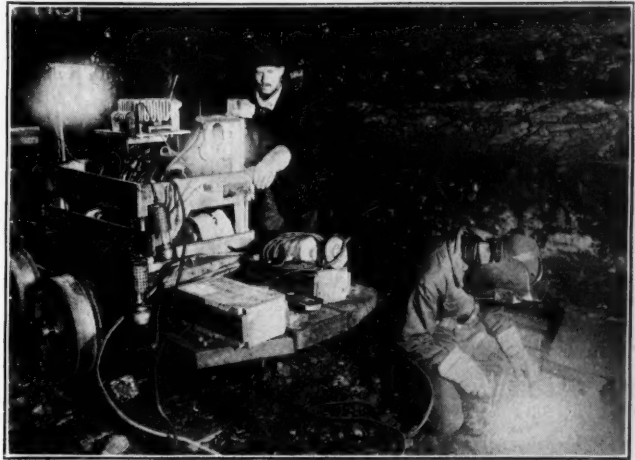
All electricians who have anything to do with the operation of electrical apparatus in coal mines are confronted with the difficulty of maintaining voltage at distant points in the mine. In some cases insufficient trolley copper is provided so that the drop of voltage occurs in this wire. More frequently the decrease in potential is due to a poor track return, for in most mines the track is not given as much attention as it ought to have, and little care is expended on its bonding.

This neglect has been somewhat justified in the past because no bond was offered to the electrical engineer of the mine that would maintain a good contact and therefore a low resistance when once installed.

There is enough acid in most coal mines to seriously impair the conductivity of any mechanically applied joint in a short period. As far as this goes, I think it is safe to say that few mechanically applied bonds are in good order six months after they have been installed. In many cases the corrosion has progressed to such a point that the presence of the bond is almost useless. The corrosion between the inside of the hole which takes the bond head and the outside of the copper bond has proceeded to such a point that the resistance is so high, that most of the current flows through the earth.

The same conditions that make a mechanically applied bond of doubtful value in the coal mine simultaneously decrease the resistance of the ground return. In the majority of cases, however, a well bonded track greatly improves the voltage regulation, especially at the more distant points of the mine.

A little thought will show that the voltage regulation on the mining machines or locomotives is of great importance for the reason that with the piecework rate of payment, the miner is interested chiefly in getting out coal and not greatly concerned in preventing burnouts of armature or fields on mining machines or locomotives. Any electrician knows that when the potential on a machine gets down to 100 volts or less the effort to make the machine do its normal work causes so much current to flow as to burn the machine up in a comparatively short time.

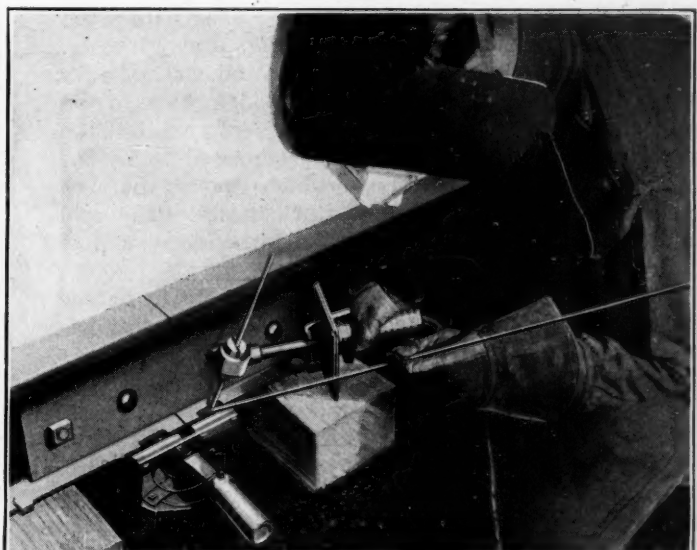


WELDING EQUIPMENT IN OPERATION

If, therefore, some method can be offered to the coal-mine operator that will insure the bonds on the track remaining in good condition, the slight expense of installing such bonds will be more than repaid in the decreased repair bills, to say nothing of the increased output. A bond of this character has been developed by the Lincoln Bonding Co. within the last two years.

Experience shows that a bond on the ball of the rail is not practical, for coal cars have a bad habit occasionally of getting off the track; and a coal car off the track will scrape away all the bonds that have been applied to the ball of the rail. It is therefore necessary to place the bond under the rail in order to protect it from the damage from coal cars when off the track.

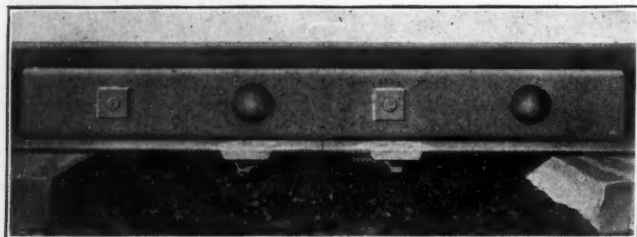
The connection between the bond and the rail is made by use of the electric arc, and in this process the copper and steel are fused together. Experience has shown that the connection between the bond and the rail will last longer than the bond itself, where both are exposed to extremely bad acid conditions. In other words, the part of the bond that hitherto has been the cause of failure has been made the strongest part of the bond. These bonds can be applied in a few minutes, each head requiring about 30 sec. to apply. Many thousands of such bonds have been used thus far with satisfactory results when properly applied.



SLIPPING A BOND INTO POSITION UNDER THE RAIL AND WELDING IT IN PLACE

This process, while it is the best that has been developed for mine bonding, and while the skill required for successful application of the bonds is small, it is not foolproof; and if the operator goes to trouble enough he can put a bond on in poor shape. It is easier, however, to put the bond on well than it is to place it on badly, and the number of complaints arising from poor bonds is small.

The machine that supplies the current for welding the bonds is a dynamotor of light weight and compact



A BOND WELDED IN PLACE

construction. The total weight of the machine is about 400 lb. and its dimensions are approximately 24 in. long, 17 in. in diameter and 20 in. high. In addition to the bonding of the rails, the same machine may be used for all classes of welding in machine shops and in any mine that does its own repair work. The machine will save its cost every year in the repair shop exclusive of what it will do in applying bonds in the mine. In a number of cases on demonstrating trips, repairs have been made that saved almost the cost of the machine the first day.

Australian Brown Coal

BY COMMERCIAL ATTACHÉ A. W. FERRIN
Melbourne, Australia

A threatened but averted strike of the coal miners of New South Wales and an actual coastal shipping and wharf labor strike, which has caused a shortage of coal in several states, particularly Victoria, has revived interest in the remarkable deposits of so-called "brown coal" in the Gippsland district, Victoria.

This brown coal seems to be coal in the process of formation, not completely carbonized, but sufficiently so to make it a good fuel for many purposes, though not for the manufacture of coke. If mixed with wood or black coal it can be used for domestic purposes. It looks to be something between wood and coal. Chunks of wood have actually been found imbedded in the brown coal, and lumps of the coal itself frequently exhibit the grain of wood. The deposits are supposed to be the residuum of vast pine forests which covered part of the State of Victoria in prehistoric times. The coal in its present form is softer than bituminous, and is dull black or snuff brown in color.

The brown coal beds of Victoria are said to be the thickest in the world. At Morwell 780 ft. of coal has been passed through in a bore of 1010 ft. The four principal areas of occurrence cover approximately 1200 square miles of an average thickness of 50 ft. The depth of the coal seams below the surface varies from 60 to 500 ft., the average being near to the first figure.

No extensive mining operations in these areas, which are controlled by the State of Victoria, have yet been carried on. Up to 1916, the last year for which official figures are available, the total amount mined had been

but 84,663 tons, and the 1916 production was only 2915 tons. But plans are now being made for a more rapid development, which will doubtless be accelerated by the present abnormal demand created by the strike situation.

Before the war a private syndicate, said to have a backing of \$100,000,000, was negotiating for one of the larger deposits, but the state did not think it proper to permit a private company to acquire so valuable a natural asset. The total amount of brown coal in Victoria, in four distinct large areas and numerous small and widely divided deposits, is estimated at 30,000,000,000 tons.

A typical analysis of the brown coal at Morwell, the center of the largest area, showed the following composition (in percentages): Water, 53; volatile matter, 24.50; fixed carbon, 21.50; and ash, 1. Further tests showed sulphur, 0.7 per cent.; nitrogen, 0.3 per cent.; calorific value, 5500 to 6000 B.t.u.; evaporation value, 5 lb. of water; gas per ton, 6500 cu.ft.; ammonium sulphate, 32 lb. per ton.

International Mining Machinery Exposition

Announcement is made by the Merchants and Manufacturers Exchange of New York that one of the permanent expositions in Grand Central Palace will be the International Exposition of Mining Industries. Since the announcement made some weeks ago that the Merchants and Manufacturers Exchange was to take over Grand Central Palace for the purpose of converting it into a trade clearing house, considerable comment has been made in many lines of industry, especially in the mining world.

The Nemours Trading Corporation owns and controls the Merchants and Manufacturers Exchange of New York. It has 19 branch offices and 3000 foreign selling agencies throughout the world.

Through representatives of the Nemours Trading Corporation, inquiries from many parts of the world where machinery and other commodities are desired will be referred to the Merchants and Manufacturers Exchange, and those pertaining to mining will be referred to the mining exchange and exhibitors of the specified lines of goods so notified. The Exposition of Mining Industries will include all that is latest and best in machinery used in the development and exploitation of metal mines, non-metal mines and oil wells. Likewise machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

People going to the Palace interested especially in one line of goods in one exchange will take advantage of the opportunity to visit the other expositions and exchanges in the building with the result that they will find other things of interest in addition to what they came especially to see.

Coal Age Index

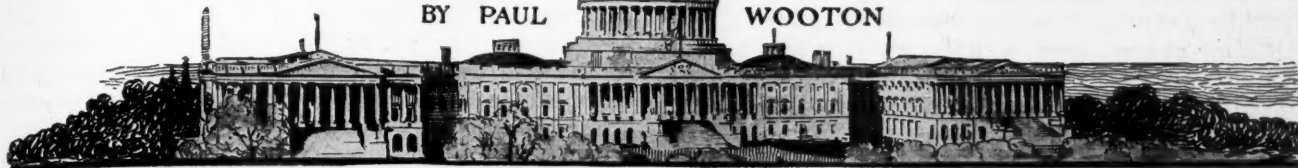
The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1919 is now ready for distribution, and a copy can be had by addressing a postcard to the Subscription Department of *Coal Age*.

NEWS FROM

THE CAPITOL

BY PAUL

WOOTON



American Coal Output and Some Problems of the Industry

Whether the Senate will undertake an investigation of the coal industry has been put up to the Republican steering committee. At the request of Senator Frelinghuysen, complete statements as to the situation in anthracite and bituminous coals have been submitted by E. W. Parker and George H. Cushing respectively. These statements, along with information furnished by consumers and others interested, are being used as the basis for discussions which are in progress between Senator Frelinghuysen and members of the steering committee. Some of the facts submitted by Mr. Cushing are as follows:

We are coming now to a time when the whole coal business must be reconstructed. Indeed, it is being reconstructed. Among other things, three big problems confront the nation and the industry: (1) To reduce the cost of production by the introduction of possible economies. (2) To simplify the cost of transportation and to equalize distribution among the months. (3) To organize an export business in coal to meet the diverse requirements of the nation's coal business to meet equally diverse requirements of the foreign buyers.

MORE MACHINERY WILL REDUCE COSTS

If we are to reduce the cost of production in ways which are easily possible, it is going to be necessary to make larger use of machinery. This is resisted at every point by the growing strength of the United Mine Workers of America.

After the cost of production has thus been reduced, it is going to be necessary to preserve at least a part of the procured economies for the consumers. To do this, there must be opposition to the growing tendency to compel the expenditure of vast sums of money upon various social enterprises such as workmen's compensation or state insurance, health insurance, amusement in mining camps, old-age pensions, and the general line of soft-hearted enterprises grouped under the general heading of welfare work.

To equalize the distribution of coal as among the months, it is necessary to educate the public to take their house coal in regular monthly installments and to arrange, perhaps, for the financing of such purchases on something approaching the installment plan basis. There is necessary, also, a rearrangement of transportation facilities and charges which will make the supply of cars adequate at all times and the charges for transportation fixed so as to bear a direct relation only to the cost of the service performed.

In organizing to carry on the extensive foreign trade, it will be necessary to protect our relatively small supply of high-grade coal—foreign buyers naturally want this coal only and it is highly essential to our own Eastern population—by in some way preparing our greater quantity of medium and low-grade coal so it can stand the charges of foreign transportation and at the same time meet the full requirements of our foreign buyers.

These three things involve nothing short of a revolution in our fuel industry. The problems are so large they must engage the careful attention of the coal people, the citizens,

and the legislative branch of our government. We are, in a word, on the eve of the complete making over of our coal industry. The problems are large, and they must be approached in a spirit of encouragement to the industry rather than in a spirit of any hostility to it.

Coal has been the backbone of England's foreign trade. Twelve years ago a royal commission investigated England's coal situation and became alarmed about the rapid depletion of her coal reserves. It said there was need to conserve the supply, but it did not dare suggest a curtailment of her coal export because that would damage England's whole foreign commerce irreparably.

Coal was the foundation of Germany's coke and byproduct business. One part of the byproduct business was the foundation of her dye industry. Upon another rested her explosive industry, which was the corner stone of Kruppism. And Kruppism was the mainspring of her military system. Coal was also the corner stone upon which Germany built her foreign trade.

Those who study Russia believe that coal and other natural resources will be the corner stone of the new Russian industrial developments, which Russians expect will follow the restoration of order.

England has been forced by many causes to curtail her coal exports to about one-third what they were in normal times.

Germany's coal available for exports has been commandeered under the Treaty of Peace, for use by the Allies in part payment of indemnities.

It will take five to ten years to develop anything like a reasonable coal trade in Russia.

Meanwhile, America has between 40 and 45 per cent. of the total reserves of coal of the world. It can be exported through all of our gateways. We have every kind of coal known anywhere in the world. We have some ships and soon will have more. We are centrally located for supplying the world's coal requirements. We have, if used intelligently, enough productive capacity already in use to satisfy all home demands, to meet all foreign demands, and still have idle mine capacity. But it is all new to us. We are neither familiar with nor equipped to do this foreign business. Still, our foreign commerce henceforth and our industrial expansion at home must rest upon our coal program.

The Nenana Coal Fields, Alaska

The Nenana coal field, which lies about 200 miles north of Cook Inlet, Alaska, and will be reached by the new Government railroad from Seward, 364 miles distant, has been examined by G. C. Martin, of the United States Geological Survey, Department of the Interior, whose report on it has just been published. The field is about 100 miles south of Fairbanks, the inland terminus of the railroad, and is more accessible to the gold mines of the Tanana Valley than any other coal field in Alaska.

The coal is a lignite of good grade which, when the field is made accessible, will be used as locomotive fuel on the railroad, for generating power and for thawing at the gold mines, as domestic fuel in the region, and as fuel on steamboats that ply on Tanana River and possibly on some of the boats on the Yukon.

The report gives the classification of the coal land and non-coal land in the field by sections, contains detailed maps showing the areas of coal-bearing and non coal-bearing rocks, and gives detailed statements of the conditions of mining and transportation.

A copy of the report, which is published as Bulletin 664 of the United States Geological Survey, can be obtained free of charge from the Director of the Survey at Washington, D. C.

Coal Mining at Bolivar, Colombia

F. L. Bell, trade commissioner of the Bureau of Foreign and Domestic Commerce, has sent to the Bureau a report on coal mines at Bolivar, Colombia, which is as follows:

A coal concession obtained by Plotts, Armella y Cia. has been taken over by Parrish & Co., of Barranquilla, Colombia. It is located between the headwaters of the Rio Sinu and Rio San Jorge in the Departamento de Bolivar, Colombia. The main deposit lies on the banks of the San Jorge River.

Approximately 500,000 acres are covered by the original concession from the Colombian Government in 1913-14, and the concession still has 19 years to run. Furthermore there are 700,000 acres of additional lands containing coal deposits and petroleum indications; these lands are held in fee and are situated to the south of the lands covered by the concession in question; the 700,000-acre tract extends to the boundary of the Departamento de Antioquia. The principal outcrops of coal are along the San Jorge River and vary in size from a few inches to 12 ft. in thickness; the dip of the measures varies from 14 to 60 deg.

The deposit being developed at the present time is located near the town of Playa Rica. The seam has a thickness of 10 ft. and a pitch of 14 deg. The coal operation is at the river bank where surface soil of from 1 to 2 yd. in thickness is being removed to uncover the coal. About 3000 tons of coal have been contracted for, to be delivered at the river bank for 25c. per ton. This amount of coal is to be shipped down the San Jorge River to its junction with the Magdalena and sold in Barranquilla as an experimental shipment, the contracted price delivered at Barranquilla being \$15 per ton. It will be used on the Barranquilla-Puerto Colombia and Santa Marta railways.

Several analyses of this coal varied as follows:

	Per Cent.
Moisture.....	8.0 to 11.0
Fixed carbon.....	44.0 to 48.0
Volatile.....	38.0 to 41.0
Ash.....	1.8 to 3.4
Sulphur.....	0.2 to 0.3

These analyses cover three seams of coal of from 5 to 10 ft. in thickness.

In the lower part of the concession outcrops of seams of coal are found dipping about 60 deg. One of these beds, with a thickness of 6 ft., will be opened; it is more accessible but will have to be worked by a shaft. No analysis of this coal has been made to date, but it is apparently of a much better grade than that noted above. The coal has been tried out by the Barranquilla and Santa Marta railroads, both of which have given an order for 500 tons at \$15 per ton, f.o.b. Barranquilla.

Parrish & Co. have recently sent a small steamer with workmen and equipment to clean out the trees and snags

along the upper reaches of the San Jorge River in order to bring out the experimental shipment of 3000 tons mentioned above. Steamers of 100 tons cargo capacity have gone up as far as Playa Rica, but with difficulty, on account of the snags encountered. Steamers of 150 tons capacity can get up this river to within 10 miles of the coal deposits any time; that is, to within 10 miles of the lower, or heavy pitching seams of coal. These deposits are the only known good grades of coal found on the banks of a navigable stream in Colombia.

It is proposed by Parrish & Co. to transport this coal down the San Jorge River in 60-ton scows to Calamar and Barranquilla. From Barranquilla this coal can reach Santa Marta via La Cienaga by water transportation also, a distance of 50 miles.

There is estimated to be sufficient water during the dry season in the San Jorge River to carry 40- to 60-ton barges down to the junction of the San Jorge with the Magdalena River. The San Jorge is navigable for 150-ton steamers up as far as the coal beds during nine months of the year. The river has been carefully mapped by K. C. Parrish, of Parrish & Company.

The present preliminary plans of Parrish & Co. are to open up several seams and get out enough coal for local consumption—that is railroads and river steamers—and also to try it out for bunker coal. The local consumption is estimated as being 1000 tons per month at the present time. If the proposition then appears feasible, the present operators would consider a deal with some large company. There is an unlimited quantity of coal, the proposition being a question of transportation and the quality of the coal itself.

Mining costs will be less than 50c. per ton, coal delivered at river bank ready for loading. Transportation by barges to Barranquilla is calculated at from \$3 to \$6 per ton at the present time. There are no facilities for cheap and rapid handling of coal at either Barranquilla or Puerto Colombia.

Commissioner Bell states that those who desire further information and data on this subject should address K. C. Parrish, of the firm of Parrish & Co., Barranquilla, Colombia; or L. B. Jackson, Sapulpa, Okla.; or James S. Harvey, Barranquilla, Colombia.

Insurance of Discharged Soldiers

On July 26, Secretary Glass signed a decision ruling that discharged soldiers, sailors and marines who dropped their insurance may reinstate themselves as insured within 18 months of discharge without paying back premiums. All they will be asked to pay will be the premium for the current month and for the time during which they received coverage without payment of premium—namely for the month of grace provided in the policy. Every mine executive should induce every discharged soldier, sailor or marine in his service who has not maintained his insurance to renew it immediately and thus secure the terms of this offer.

Senator Lenroot introduced two bills into the Senate on July 24, which have a direct bearing on the coal industry. The first, S. 2618, provides for the disposal of nonmetalliferous mineral deposits owned by the United States separate from the surface of the lands wherein they lie, and for other purposes. The second, S. 2620, provides for the leasing of coal deposits owned by the United States outside of Alaska.

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Disposal of Mine Rock and Slack

YEARs ago the only way of disposing of rock was to dump it around the shaft, drift mouth, slope entrance or tippie. After a while when railroads began to own coal mines it began to be quite a common practice to put in a rock chute with a bin-like arrangement so that rock could be dumped into railroad cars and hauled away from the crowded tippie site and out to some place where a fill needed widening or a trestle required filling. But there is soon no further need for such work, and the rock is run out to waste at some point along the road where it probably does little harm but equally does little good.

Railroad dumping is, however, not a convenient way of handling material. As a rule the railroad finds the transference of the car a nuisance; in fact, unless there is an ownership connection, no railroad will consent for any reasonable figure to perform this service. It seems strange, therefore, that more use has not been made of the motor truck that will take this rock and put it exactly where it is wanted.

Everywhere there is need for a fill—along that bottom road, in the approach to that bridge over the creek, to eliminate that steep grade, to widen out that short curve, to carry a sidewalk over that run, to level off that house or store plot, to ease the approach to that railroad crossing, to fill around the store wall or back of that coke yard, to bank against that ill-regulated stream, to build that reservoir dam, to widen that road or make it safe for travel in winter, to surface that roadway and to place sand rock for that piece of masonry.

With a motor truck, not only is the rock removed from the point where it is not needed, but it is placed just where it is most useful. Even if a railroad fill is projected, the motor truck will usually make it as economically as the railroad car when all the transportation annoyances of such work are considered. And then on idle days or days when rock is not coming out of the mine, the truck is available for all manner of work, for hauling top soil or manure to lots, for taking props to the mines and fence posts to the lots, for hauling sand from the creek bed, for the collection of the rubbish from sundry kitchen middens, for use in making road and railroad excavations or excavations for houses. The motor truck is the natural means for disposing of waste rock where the rock has to be needed.

Where it does its proper work how many problems of recontouring the country will be solved without any real expense other than the needed wasting cost, how many new openings will be provided with a roadway graded excellently and without expense with the rock from other mines, how much bony coal will surface highways which otherwise would be unsurfaced? The motor car will revolutionize our methods, for it goes almost everywhere, whereas the railroad car goes only

to those few points for which elaborate preparation has been made.

The motor car will help in disposing of slack especially where a thin layer only can be spread over the storage site for fear of spontaneous ignition. It is easier with a motor truck to build a six-foot pile than it is to do it with a railroad car, provided the distance is short.

To sum up the matter: It will be found that the motor truck is more flexible than the railroad car. It is ready for service everywhere. Its use is well worthy of thought when the disposal of rock and slack is under consideration and where it has been decided that disposal at the immediate mine site is out of the question.

When prices of commodities go up, money goes down. Owners of commodities—lots, houses, comestibles, clothing—get rich. Owners of money—bonds, mortgages, bank balances—grow poor. Every rise in wages makes commodity owners rich, and impoverishes owners of money, and among the owners of money are working men with bank balances. Wage increases cause changes in the relative wealth of both wage workers and capitalists. They do not as a whole help either one class or the other.

Starving Public Utilities

AHOSTLER is reported to have gradually and systematically reduced the feed of his horse till the ration of the well-trained animal consisted of one wisp of hay a day. It was a great achievement and the horse took some months to reach that acme of abstention, and at the end he spoiled the experiment by incontinently dying. You can't tell how soon valuable experiments of the kind described may be rendered of no avail by the lack of coöperation on the part of the subject experimented on.

In substance, Walker J. Hines has tried, on the railroads, this method of saving. They have done without coal till the mines starved along the road and until the prospect of a coal shortage loomed ahead. They have done without car repairs till conditions threaten to be as bad as when the Government took the railroads over. They have delayed road repairs till the cars sway from side to side like a child's express wagon.

A horse will live for a while on the meals it once enjoyed, and a railroad will carry on for a time on the money once expended on it. But the strengthening fare that is known as maintenance is needed after a while, and if the railroad does not get it, all the full meals of past months will not avail.

All public utilities, whether publicly or privately owned, are just now being starved. They do not do well on such treatment. They are neither satisfying, prompt nor safe when so treated. We have got to learn that a steady profit ration is necessary if we would have them serve the public. This is true of all public utilities, whether they be railroads, street railways, electric-light plants, gas plants or coal mines. Unfortunately many anthracite mines are not only public utilities but have been afforded for a long term the usual treatment meted out to public utilities. If that treatment still continues the hard coal producers will fail, like other essential public servants, to perform their duties as satisfactorily as they should.

Increased wages are rarely as bad as increased privileges, for a larger wage may not produce a lessened product, but a privilege, such as shorter hours and apprenticeship restrictions, is almost sure to do so. Lessened product reduces the national wage fund, whereas a general rise in wages only holds a magnifying glass over the wage fund and makes it appear larger than it is.

Our Convention Safety Number

THE HEAT of the summer will by the last of September be over, and the vacation season will be at an end. Then will follow the second summer institute season. The American Institute of Mining and Metallurgical Engineers and the National Safety Council will hold their summer meetings and between these will be the great housewarming meet of the United States Bureau of Mines with its first-aid and mine-rescue competitions. These meetings will be the biggest institutional events of the year, for they are all international associations. *Coal Age* expects to celebrate these events with a special issue on Oct. 9, which will of course be a first-aid, safety and welfare number, and will detail the conventions in full.

Mysterious is the sympathy between the exploited and exploiter. The man whose salary or earnings have not increased during the war speaks sympathetically, about the cost of living, with the working man whose mounting wages have been the cause of the high cost, and who has made living difficult to the man of stable wages. You would expect the exploited workman to condemn his exploiting associate but he doesn't. He sides with him against some imaginary profiteer.

As To Larger Wages and Shorter Days

THE RISE in prices, in the anthracite region, for clothing and other household goods, is making the employees of the mines uneasy, though they may be assured it is not a condition that is peculiar to them. Those whose wages have not been raised or have been raised but little since the war commenced have had to meet the same phenomenon while the war continued and since its close.

No one surely will deny the mine worker the right to have the cost of living before the war and now accurately determined and to receive a rise in wages when a new contract is made, if it is merited, in proportion to the increase. The public should and must be willing to meet whatever burden may fall on it if the computation when made shows the change to be just. But if it prove that such an increase in wage is not justified, no discontent on the part of the mine worker will make it expedient. The cost of living *must* be kept down by keeping down the item of labor, which item is the cause of all the trouble from increased costs.

A shorter working day seems generally demanded, and the demand is explained and excused by the fact that mining companies have in some few cases shortened up the time for the daymen to six hours, as has been noted already in recent issues of the Labor Department of "Coal Age." To superficial observers, this provident act seems to justify every contention that six hours is enough for a working day. And so it is, for those daymen where a part of the working force persists in going

home early thus laying off those who would remain because paid by the day. If the miners and their laborers were to quit work after only two hours of labor the day men in those mines that have slope chambers might find it hard to find any work that they could do long before high noon. The best way to get a full day's run is for everyone from contract miner to trapper boy to work eight hours whenever the chance is afforded.

The men are to blame and not the company for the short time, which is a hardship on the day hands and one that they may not be able to meet, but their remedy is surely to be found in coercing the miners and laborers who persist in working only a short day. To require the company to pay for a full day when only a part of a day is worked, through no fault of the company, is to put a penalty on the company for the misconduct of the miners and laborers. The public does not propose to pay the daymen for the folly of the contract miners.

The Department of Labor declares that in the coal mines there were 370 strikes in 1916, 339 in 1917 and 149 in 1918. In the three years the mine workers had 858 strikes—more than the workers in any other industry. Machinists were second with 653 strikes. May we ask, Was the strike frequency of the mine workers the outcome of that clause in the agreement requiring that all disagreements must be arbitrated?

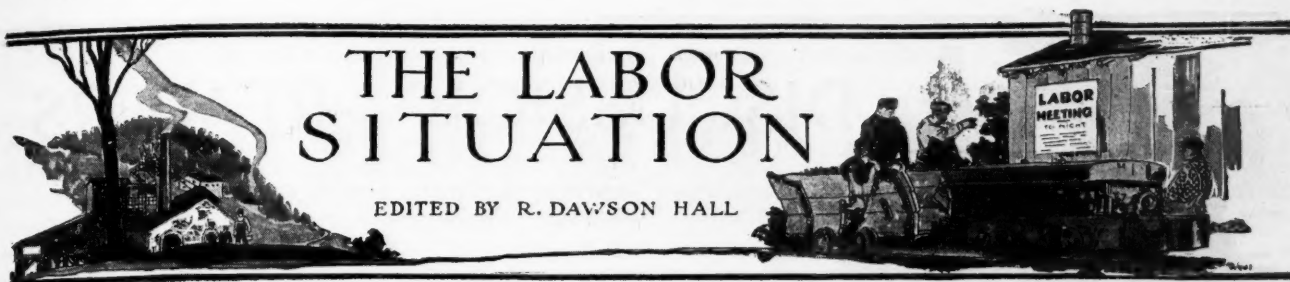
Educational Pitfalls

AUTHORITY is one of the biggest pitfalls in education. Too many students at our colleges believe that they enter the institution, merely to learn facts. The dicta of authority are avidly accepted and stored away, the student becoming enamored of a situation which saves him necessity for further thought. He likes to leave his thinking to the godlike beings enumerated in his Trautwine, his Peele, or his Marks. "It has been said," is with him the end-all and be-all of his education.

One should go to college, not so much to be crammed as to be educated. The idea of such institutions should be "to draw out," as the word well expresses it, the analytic abilities of the brain. The effort should be, not merely to store facts in the mind, but to teach it to function, to develop imagination, criticism, inquiry, creation. Education fails if it falls short of that. The brain of the crammer becomes rather an orderly warehouse than a home in which the reason can live and thrive.

Your college man who cannot write evinces himself largely as a "spoon-fed" fellow. His diction is as clear, and only as clear, as his thoughts. If he only thought rightly, he would express himself plainly. The confusion of the poor writer is not in the pen or in the hand, but in the brain. He has the thought grasped by the heel; how shall he, with such an uncertain purchase, stand it up fairly on its feet?

The privileges of the working man if they interfere with his production ultimately reduce his wages or at least the wages of other working men, for low production means, in the long run, low wages. A privilege may be rated as an unimportant working condition, but it may cost dearly in the end, sometimes to the privileged employee and sometimes to the workman in other trades.



General Labor Review

Frank J. Hayes, president of the United Mine Workers of America, who is now in a hospital undergoing a course of treatment, has been granted a four-month leave of absence and his duties will be performed by John L. Lewis, vice-president. This announcement causes surprise in certain circles, but by those on the inside and conversant with the situation it was expected. Hayes has been ill since last spring. Some months ago, before the armistice, he was summoned by President Wilson to go to Paris and consult on the industrial and especially the coal-mining situation.

During the period of the war the officials of the United Mine Workers were under a great nervous strain, and now are facing a situation considered one of the most important in the history of the organization and the country. With the ratification of peace, a new contract must be negotiated by the operators and miners. By some it is thought that a crisis is confronting the workers. Hence the great surprise over the temporary retirement of Hayes. Notice to this effect was made on July 21 by Secretary-Treasurer William Green.

UNION QUARRELS DISTURB SCRANTON DISTRICT

After a period during which the disagreement regarding and disputed election was quietly shelved, the meeting held by District No. 1, of the United Mine Workers of America, in Scranton, Penn., broke into riotous debate which ultimately resulted in its breaking up in confusion. The excitement arose on the submission of the tellers' report, when a resolution was presented which called on the convention to inquire into the charges of fraud. In the confusion which followed a motion to adjourn was put and carried. At the morning session of the same date, July 25, a resolution called on the Government to take off restrictions from the sale of beer containing 2.75 per cent alcohol or less.

On July 30, the Locust Gap colliery of the Philadelphia & Reading Coal and Iron Co. was laid idle because of a strike of its 1000 employees. It seems that the company reopened the Holmes workings, and six men violated a rule of the union by loading their own coal. The union men contend that the company violated its contract by not meeting with union officials and deciding what working conditions should prevail in the newly opened area.

At Coral, Indiana County, central Pennsylvania, just south of Indiana town there has been a strike lasting several months. As the men would not work the company evicted them, whereupon they secured tents and camped on the hills above the town. The coal company obtained an injunction restraining the men in the tent colony from interfering with the men who wanted to work. It was claimed that the striking miners would not heed the injunction and 17 were arrested, given a hearing and committed to jail for contempt of court.

At last advices the strike at the Brackenridge mine of the Allegheny Coal and Coke Co., mentioned last week, still continues. The Allegheny Steel Co., which uses the product of the mines, is adjusting its plants to the use of gas as far as is possible. It expects to get coal from other sources if the strike continues. The company declares that, whereas the union scale calls for 62c. per ton to loaders, the company voluntarily pays 77.77c. per ton. The union scale is 16c. per ton for cutters and the company scale 19.55c., the difference being 25.4 per cent in one case and

22.2 per cent in the other. The loaders average about 10 tons per day and the cutters about 150 tons for a two-man crew, but energetic men frequently load 15 to 20 tons a turn, which cutters and scrapers often cut 200 tons a day for days at a stretch.

Representatives of the operators and mine workers of the New River District, after many weeks of conferences, beginning early in June, finally reached an agreement upon the terms of a wage contract in the New River field, on Wednesday, June 30, the agreement reached being subject to ratification by the operators and mine workers respectively. It was thought when this was written that the mine workers would hold a convention on Aug. 5 and would ratify the new agreement without much quibbling since they secured all that they demanded, including even the union check-off system which in effect means that the closed shop will be in operation in the New River district hereafter.

The outstanding sections of the new agreement which will become effective on Sept. 1 are as follows: The wage agreement will continue in effect from September 1, 1919, until the following April and thereafter will remain in effect as long a time as will the new agreement which is to be negotiated by the operators and miners of the Central Competitive field, a field which comprises the States of Illinois, Indiana, Ohio, and western Pennsylvania.

There is a provision in the agreement that should there be any change in the wages of the Central Competitive field, the same increase or decrease shall apply to wages in the New River District. Any decrease in hours to be worked which may be ordered in the contract to be written by the operators and mine workers of the Central Competitive District shall be held to apply on the Kanawha agreement.

AGREEMENT CLEAR AND UNEQUIVOCAL

The contract has been written so that its terms will be easily understood, and it is said that there will be no excuse for a single strike during the life of the contract, heavy penalties being provided for all strikes or lockouts.

The wages to be paid for mining as well as for inside and outside day labor are practically the same as provided under the terms of the existing wage agreement. There will be some slight differences, however, in striking an average for the different classes of labor. Complete recognition of the union, with the collection of the dues for the members of the United Mine Workers, is a new feature of the agreement. There are a number of men employed in and around the mines who will be exempted from the jurisdiction of the United Mine Workers, but the check-off system as agreed upon, which is similar to that in use in the Fairmont field, is a measure of so drastic a character that, with the few exceptions noted, only union mine workers will now be employed in the New River mines. The provision for cleaning coal is rigid. This has special significance in the districts producing smokeless coal because the fuel has to be of "Navy Standard."

The agreement was not entirely satisfactory to either party to the contract, but as usual represented a compromise between the conflicting views of the two parties to the final agreement. The opinion has been expressed by some New River operators that on the whole the contract will be reasonably satisfactory to the operators of the field and when thoroughly understood by the mine managers, will be accepted, no doubt, as the best solution of several difficult industrial problems which have confronted the operators and mine workers of the New River District for some months.



DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Fusibility of Ash in Burning Pennsylvania Coals

Letter No. 1.— I have read with deep interest the paper on "Fusibility of Ash from Pennsylvania Coals," by W. A. Selvig and A. C. Fieldner, *Coal Age*, June 12, p. 1086, but there is one statement made in that paper that I think should not be allowed to pass without comment and qualification.

The authors state, on page 1086, "The ash from the anthracite region of Pennsylvania is highly refractory, coming in Class 1. The softening temperature, in practically every instance, is above 3000 deg. F."

For the purpose of discussion, the authors of this paper have classified coals in three subdivisions or groups, according to the fusibility of their ash: Class 1, refractory ash softening above 2600 deg. F.; Class 2, medium fusibility, softening between 2200 and 2600 deg. F.; and Class 3, easily fusible ash, softening below 2200 deg. F. Then follows the statement just quoted, placing the anthracite coals of Pennsylvania in Class 1, as having a generally refractory ash.

Now this statement no doubt is true in so far as it covers the ashes of coals tested and reported in this particular paper, but the fact remains that the ash from certain anthracite coals not included in the results published by Messrs. Selvig and Fieldner do not conform to their statement.

OTHER ANALYSES SHOW LOWER FUSIBILITIES

In order that the statement made by these authors may not mislead anyone into thinking that all anthracite ash is highly refractory, I desire to submit some data on anthracite ashes tested in my laboratory. In an article entitled "Chemistry in Coal Mining," published in *Coal Age*, Vol. 10, p. 296, I have already called attention to the different fusing temperatures of the ash of anthracite coals taken from different beds. The table given in that paper showed that the ash of some anthracite coals fused between 2210 and 2282 deg. F., whereas the ash from other anthracite coals did not fuse at a temperature of 2570 deg. F., that temperature being the highest reached in the tests made at that time.

Later work, in which higher temperatures have been reached, has shown practically the same results. The ashes from Shamokin, Locust Mountain and hard white-ash coals have, in general, shown high fusing temperatures, mostly above 2600 deg. F. The ashes from Lorberrys coals have shown somewhat lower fusing temperatures, while those from the Lykens Valley coals have been very much lower, some of which fused even below 2282 deg. F.

The lower fusing temperature of the ash seems to be coincident with a relatively higher content of calcium oxide and sulphuric anhydride in the ash of the coal. The sulphur content of the coal itself, in the case of the

Lykens Valley coals, is very low; but much of this sulphur is left in the ash after burning the coal, possibly in the form of calcium sulphate. Further work on this problem is highly desirable.

It might be remarked, in passing, that, while the ash from Lykens Valley coal has a low fusing temperature, that from bony coal or slate has a fusing temperature above 2600 deg. F.

Unfortunately, our tests on coal ash were made in a rather crude way. The ash, molded into the form of a small cone, was heated in a muffle furnace over a coke fire, the temperature being determined by comparison with Seger pyrometric cones. The atmosphere, if we may judge from the appearance or color of the ash cones, was an oxidizing one.

We do think, however, that this work is of considerable value, at least from a comparative standpoint, and I submit this information as modifying some of the conclusions reached by Messrs. Selvig and Fieldner.

A. G. BLAKELEY, Chief Chemist

The Philadelphia & Reading Coal & Iron Co.
Pottsville, Penn.

Lawful Examination of a Mine

Letter No. 1.—I want to offer a few comments on the excellent article of Steve Gosnell, *Coal Age*, July 3, p. 18, which he has written in the interest of safety-first in mining. And, first, let me say that Mr. Gosnell is right in saying that a mine should be examined not more than three hours before the men enter the mine for work, and when no one is present underground who would molest the circulation of air by carelessly leaving open a door in the workings.

It has frequently happened in my examination of mines that I have run across doors carelessly left open by motormen. This is very apt to occur often in mines where strict discipline is not maintained by the management, and it is easy to understand that an open door, if not discovered in time by the fireboss, would soon create a dangerous condition in the section of the mine where the circulation of air would be cut off.

As suggested in the article to which I have referred, every mine should be examined within three hours of the time the men go to work. If this is not done it is possible for a dangerous condition to develop by reason of a fall of roof or any settlement of the overburden that would release gas in the workings.

In every case, the territory that a fireboss must cover should never be so great but that the work can be done properly and in accordance with the requirements of the law, within the space of three hours. During the remainder of the shift, the fireboss should be employed looking after the ventilation, erecting brattice where such is needed and detecting dangerous roof and coal in the working places in his section.

As an instance where mine examiners have too large a territory to look after, let me cite a mine in southern Illinois that puts out 4000 tons of coal a day and employs but two men as examiners. In that mine, one examiner must inspect 4 splits of air, visits 224 places, pass through 41 trapdoors, covering 10,000 ft. of motor road, 6000 ft. of manways, 2000 ft. of bottom and run-around. This is in addition to the 8000 ft. he must travel in the first split, 7000 ft. in the second, 12,000 ft. in the third and 7500 ft. in the fourth, makes a total of 52,500 ft. the man must walk to complete a single examination of his section of the mine. The total distance is almost 10 miles.

Walking at a speed of 3 miles per hour, which is a good average pace underground, it would require 3 hours 20 minutes to walk this distance. Then, allowing 1 minute for examining each place visited and for making the necessary observations and tests, another 3 hours 44 minutes is necessary, which would make the total time spent inside, 4 minutes over 7 hours. If the examiner's report is made out properly, about another hour will be consumed in that work and in taking up the checks of the men whose places have been found to be unsafe for work.

There is no man living who can do efficient work in examining a mine under such conditions. To insure safe conditions in mines, safe and reasonable rules must be adopted. In one mine that I have in mind, there are employed four face bosses who are uncertified men and one who holds a certificate, besides a mine manager (foreman) and a superintendent, making seven men in charge of the work of putting out the coal, while only two men are employed as examiners to look after the safety of the mine.

My experience of 23 years in the mines as miner, dayman, examiner and manager convinces me that fewer accidents will occur in the mines of Illinois if more certified men are employed as face bosses and the mine examiners be given less territory to look after.

Harrisburg, Penn.

G. D. YORK.

Certification and Safety

Letter No. 13.—In his letter, *Coal Age*, July 3, p. 30, William Wesnedge states, "the past history of coal mining is a record of great loss of life and property as the result of unrestrained and careless practices." Let me add that it is these oft-recurring disasters in mines that have made necessary the enactment of laws requiring that mine officials shall possess greater practical knowledge, and the enactment of such laws has made the mining of coal safer today than formerly.

Yet, Mr. Wesnedge, in referring to what is required of a candidate for a certificate of competency to act as a mine foreman, says that a longer period than five years' practical experience is not always essential. The mining laws of Great Britain (Coal Mines Regulation Act) require but five years' practical knowledge of mining coal, and mine officials there, today, possess no more practical knowledge than formerly.

Now it was my meaning, in my last letter, Apr. 17, p. 723, that a mine foreman should possess nine years' experience in general mining work and five years' experience in shotfiring and firebossing, making fourteen years in all, before a man could be a candidate and sit in examination for a certificate of competency to act as mine foreman.

I cannot agree with Mr. Wesnedge when he says, "the granting of a certificate to a candidate is simply evidence that he has satisfied the requirements of the examining board. Here the authority of the state mine inspector, as a member of the examining board ends." In that case, let me say, it would be left to a contractor of labor or a mine operator, to ascertain whether or not the holder of a certificate is competent to take charge of a coal mine.

I contend that a body of men constituting a board of examiners and charged with the issuing of certificates of competency should be held responsible for the competency of the men they examine and to whom they grant certificates. In my judgment, it would be absurd to refer a man, who has been examined and granted a certificate of competency by an examining board and certified to as possessing a practical and theoretical knowledge of mining, to a contractor of labor to ascertain whether he is competent to manage a coal mine.

Springfield, Ill.

JAMES M. RODDIE.

[The discussion of "Certification and Safety" will close with Letter No. 15, now on hand.—Editor.]

Firebosses as State Officials

Letter No. 10.—Referring to the discussion of this subject, kindly permit me to express the opinion of a fireboss who has spent several years in the performance of that work in coal mining. My experience compels an opinion against the employment of firebosses by the state.

Allow me to say, in all seriousness, that there is no individual employed in the operation of a mine, from the superintendent down to trapperboy, on whom the responsibility for the safety of the mine and the men employed therein rests so heavily as on the fireboss. Everything depends on the careful and thorough manner in which he examines the mine and the faithfulness of his report regarding its condition.

The fireboss must report the condition of each working place, in respect to its ventilation, presence of gas, condition of roof, sides and coal face, besides making numerous other observations in regard to amount of coal down, number of cars, timber and other supplies on hand, and be able to report the results of his observation on his return to the shaft where he must enter his report in the book for that purpose, and hold back the checks of men whose places he has found unsafe to allow of their working.

WHAT HARM A STATE FIREBOSS COULD DO IF HE WAS SO DISPOSED

Consider, for a moment, the position of a fireboss employed by the state. He is beyond the control of the superintendent and mine foreman and, in that position, can often throw the mine idle by reason of his absence, when the superintendent or foreman would be unable to employ another fireboss to examine the mine. Or, if so disposed, a fireboss can report finding gas where the superintendent or the foreman claims there is none. My idea is that a good fireboss will perform his work as faithfully in the employ of the company as when employed by the state, and avoid the possibility of the difficulties arising such as I have mentioned.

By way of illustration, allow me to cite an incident related to me by my father when I first undertook the work of firebossing. At that time, my father was

superintendent of the mine and, in order to impress on me how much the safety of the mine depended on my careful and faithful performance of my duties as fireboss, he related an incident that occurred when he was 17 years of age. He was then working with a safety lamp at the face of a chamber, in a mine that was so gaseous that the inspector was accustomed to visit it about once a week.

On one of his visits, the inspector called to my father to bring his lamp and come. He hesitated to obey, stating that he was working on tonnage. The mine foreman, however, said, "Hugh, take your lamp and do what the inspector wants you to do." The inspector then sent him into a certain place and he went, until he found an accumulation of gas and stopped. The inspector urged him to proceed; but he refused, saying that the law was that when one got a cap on his lamp he was to withdraw.

OBEDIENCE TO MINING LAW REWARDED

The inspector then turned to the mine foreman and said, "If you appoint this lad as fireboss I won't require to come here more than once a year, instead of every week. The appointment was made and my father's record, from that time was one fatal case underground, in 40 years; and that was the result of a miner's carelessness in going back to the face too soon after firing a shot, and not waiting for the smoke to clear. He was caught under a fall of slate where a timber had been knocked out by the shot. My father's advice to me was that, wherever I suspected danger might exist, to go into that place ahead of the miner and make sure that it was safe for him to work. I have followed that advice, and my record is one fatal case in 30 years and that was the result of a contravention of the mine law by a careless miner.

Let me say, in closing, that while I agree with the suggestion made in another letter, that firebosses should perform their work in the nightshift, so as to give them ample time to remove gas and other dangers where they exist, I consider it as important that every working place should be examined by the fireboss not more than three hours before the time for the men to enter the mine for work. To my mind, that is the only safe method of firebossing.

FIREBOSS.

McKeesport, Penn.

Letter No. 11.—As one who holds a position as mine examiner (fireboss) and who has held a similar position (examining deputy), in various parts of the world, I trust you will allow me to give an opinion on the question of firebossing.

Some 22 years ago, in the North of England, a miner (agitator) arose to ask the appointment, by the Home Office, of a miner who would be charged with the duty of examining working places, daily, in each mine, before the men reported for work. This was at once opposed by the mining companies who claimed that the person who paid the piper should call the time.

It was not until the Maypole and Whitehaven disasters occurred that the pressure of public opinion compelled the Home Office to appoint workmen as inspectors in each district. The persons so appointed were independent of the coal owners or operators, and presumably were outside of any economic influence. This is still the practice in coal mining, in Great Britain, today, and has undoubtedly been a deterring influence

to minimize the risks that all practical mining men know are taken, in mines, daily and hourly.

In England, it is the duty of all deputies to examine each working place, three hours before the beginning of each shift, and to remain in the mine as long as any person is underground, as required by the Coal Mines Regulation Act. The principal objection to the employment of firebosses by the state, in this country, as I see it, is that the appointments would be subject to political influence, and a change of administration would generally mean a similar change of state-employed firebosses.

TRAINING MEN FOR POSITIONS OF RESPONSIBILITY REQUIRES TIME AND PATIENCE

It is my opinion that, no matter how lowly the position, it requires time and money to train men for places of responsibility, and I speak from an underground experience of 40 years, as driver, trackman, mine examiner (fireboss) and mine manager (foreman). However, one must take things as he finds them, in whatever latitude he may be placed.

Referring to the comments of Robert A. Marshall, *Coal Age*, July 3, p. 31, regarding the removal of dangerous quantities of gas while the men are at work in the mine, I should think that any up-to-date examining board would reject a candidate for certificate who would suggest such a proceeding. I do not wonder that Mr. Marshall condemns the practice in his state.

In this connection, allow me to suggest that there should be greater coördination in the work of mine inspection, in the United States. It would seem that this should be under some supreme authority such as the Federal Bureau of Mines. In England, the Home Office is the supreme authority in such matters and has the power to enforce any provision of the act regulating the safety of mines and the men employed therein.

In closing, let me say that firedamp or any other gas, in dangerous quantities in mines, is a menace to safety, wherever found, from Birmingham to Seattle, and the most stringent regulations should be enforced for its detection and removal, and the law should be applicable to all states of the Union. As Patrick Henry has stated, "We can only predict what will occur in the future by referring to the past." It is my hope, however, that it will not require a series of disastrous explosions to convince the American public that firedamp and naked lights or sparking electric appliances contain all the necessary factors for such occurrences.

West Frankfort, Ill.

THOMAS McDERMOTT.

Errors in Surveying Practice

Letter No. 1.—The reference to the inaccuracies in chaining or, more particularly, measuring distances with a steel tape, which are caused by its elongation under tension, or expansion due to changes in temperature, reminds me of the extreme care taken in the measurement of baselines, in extended triangulation work and in other important operations requiring great accuracy.

Very often, in precise triangulation, it is found that the notes do not check up as closely as desired. This result is more frequently due to inaccuracies of measurement than to fault in reading the vernier, or in the handling of the instrument, in the measurement of angles. Accurate measurement is a science in itself;

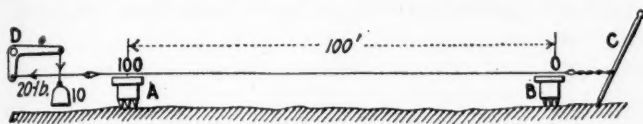
but, with careful supervision, and the use of a few homemade devices it is possible to minimize these inaccuracies and make the results all that can be desired. The degree of accuracy attained, of course, will depend on the amount of time and care taken in the execution of the work.

While it is not necessary to be extremely accurate in the survey of farm lands or when performing other similar work, a great degree of accuracy is absolutely necessary in the measurement of baselines for more important work, such as driving the tunnels under the East River, to connect the boroughs of Manhattan and Brooklyn, in New York City.

THE ACCURATE MEASUREMENT OF AN IMPORTANT BASELINE IN TUNNEL WORK

In the tunnel work just mentioned, all baseline measurements were required to be made with the utmost accuracy. The steel tape used had been sent to the Bureau of Standards at Washington and standardized for a temperature of 65 deg. F. and a tension or pull of 20 lb. When taking measurements in the tubes or on the surface, a thermometer always formed part of the equipment and all measurements were balanced or corrected for temperature.

In the accompanying sketch, I have shown a simple arrangement of homemade devices that can be employed



DEVICE FOR MAKING ACCURATE MEASUREMENTS

where accurate uniform methods of taking measurements are required. At A and B are shown two "spiders." These each consist of a round block of hard wood that fits into and rests on a section of wrought-iron pipe cut so as to form the three legs on which it stands. These two spiders are lined in with the transit, at distances of approximately 100 ft. apart.

The first spider, A, having been placed exactly over a station of the survey, the steel tape is pulled across the two spiders and submitted to a tension of 20 lb., by means of the handbar C, the pointed end of which is stuck into the ground, so that the bar furnishes a lever for stretching the tape and lifting the 10-lb. weight off the ground. This weight is attached to one arm of the device shown at D, which is supported on a suitable standard that is anchored or held firmly in place to prevent its movement while the measurement is being taken. The spiders, also, must be firmly set in the ground to make them solid.

The handbar C is moved sufficiently to raise the weight from the ground such a distance that the zero of the tape corresponds to the first station marked on the spider at A. A mark is then made on the spider B, at a distance of 100 ft. In taking the next measurement, the spider A is moved forward with the device D and the measurement taken from B to A. Levels are taken on the spiders and correction made for slope and temperature.

This method, I believe, is a good stunt and should be helpful to an engineer who has to measure a baseline for a large triangulation system. The spiders take the place of the pins in measurement and it is very easy to carry the work to half a hundredth of a foot, at least.

Pittsburgh, Penn.

LOUIS S. YOUNGLING.

Outlook in Coal Mining

Letter No. 1.—The thought expressed in the inquiry of "Operator," *Coal Age*, June 19, p. 1138, is one that is uppermost in the minds of many coal men at the present time. While I am inclined to think that the present crisis is nearing its climax, I feel that the path of the coal operator, in the future, will not be a rosy one and extreme caution is necessary.

In commenting on the probable exodus of the foreign-born miners of southern Ohio, John Moore, president of the Ohio Coal Miners' Association, estimates this at 14 per cent. of the mine labor in that state and foresees a shortage of coal production in the fall and winter months. He says, "this is no time to throw a monkey wrench into the industrial machinery of the country, which is being gradually greased; but let everybody get on the job and set things going good and proper."

LABOR SHORTAGE A PROBLEM OF THE FUTURE

In my own humble opinion, labor shortage will prove an important consideration in coal mining, for a time at least, or until the installation of improved modern machinery counterbalances the effect. Assuming that an operator has a fairly marketable product that will enable him to overcome the competitive condition that will doubtless exist in the market, and has outlined a policy for his sales force, he should then give the most of his attention to the operating department to assure himself that he has the necessary labor to operate his mines in a manner that will guarantee a uniform output and a tonnage that will give him a decided advantage in the market.

As Mr. Moore has said, the time for an operator to be continually at loggerheads with his employees is past. He must have the interest of his men at heart; learn to know them and teach them to know him, so that there will be coöperation, and there will be no reason for suspicion and disgust on either side. It is surprising how far-reaching, in effect, a little personal interest proves in promoting good-will between employer and employed. Let there be whole-hearted interest in the living and working conditions of the men.

INCREASED EFFICIENCY NEEDED TO AVOID DISASTER

As has been stated, owing to the extraordinary demand for coal during the war, many new operations sprang into being, producing much coal of inferior quality. The future will determine the life of many of these operations, the quality of whose output will be unable to compete with openings mining better coal and more favorably located. Many mines of the more favored class have been extravagant in their methods of operation and, now that the crisis is passing, the management will be obliged to get down to business and improve their methods of operating and increase their efficiency.

While I cannot agree with the suggestion made by this inquirer, which was to the effect that the coal industry is drifting toward disaster, I feel that the situation is one looking toward the survival of the fittest. His reference to mines "more favorably located" but "by no means equipped to compete with longer established operations," suggests the need of reorganization and the installation of equipment that will place such mines on a more favorable footing.

All this means that they shall abandon wasteful and extravagant methods of operating, install modern equipment and study efficiency in every branch of the work. It is surprising how substantial savings can be effected by eliminating little leaks that, as stated in the reply to the inquiry, are unsuspected and occur to a varying extent in all industries.

Consumers of coal are becoming more and educated on the fuel question. They are discriminating closely today, in the purchase of coal suited to their needs both in respect to size and quality. Because a coal has a higher heat value than another does not recommend it as adapted to the equipment in different power plants.

SALESMEN SHOULD KNOW HOW TO FIRE

In keeping with this statement, let me suggest that a good investment for any live coal company would be to have an experienced fireman initiated into the art of salesmanship to an extent that would enable him to visit customers, acquaint himself with conditions and explain to them the nature of the coal and how better results can be obtained by improved methods of firing adapted to their equipment. Such a one would also be required to inspect shipments of coal and solicit the complaints of customers, all of which would tend to promote the mutual interest of producer and consumer.

The old saying is, "Coming events cast their shadows before," and I think the dawn of a peaceful prosperity should find no one unprepared, from a business standpoint, and unable to enjoy its benefits to the fullest extent. While present indications seem to forecast the need of caution, it is no time for despair in respect to the coal industry, which promises well for all efficient operations for a long time to come.

Portage, Penn.

JEROME C. WHITE.

Letter No. 2.—The inquiry on this subject presented in *Coal Age*, June 19, p. 1138, is one of great interest and concerns a deep problem worthy of careful consideration. There is no question but that a great many men who are inexperienced in coal mining invested large amounts in that business during the four years of the war, and the results were truly surprising, as the price of coal reached the zenith, which enabled many of these new small operations to return to their owners all they had invested.

While many new ventures in the coal business were, no doubt, promoted by a patriotic spirit, there can be no doubt but that the high price of coal was the controlling factor in most instances. Also, it was recognized that many consumers of fuel were willing to take almost anything that could be shipped to market as coal. Under these conditions, almost any patriot would be willing to invest his all in the anticipation of realizing a fortune in what was generally regarded as the "golden days" of the industry.

GOLDEN DAYS YET TO COME

In my way of thinking, however, there are "golden days" yet to come and the present depression is but temporary. Then, as the sowing must always go before the reaping, the present is a time when coal operators should make all possible preparation to enable them to reap the benefits of the coming harvest when the demand for fuel will call for a large production of coal.

Speaking of mines that are isolated by reason of their position with respect to transportation of their output

to market, I consider such isolated operations as a hard proposition in the days to come, unless they can establish a camp where the living and working conditions will be inviting. In the growing scarcity of labor, it will be difficult to draw men to such isolated mines and hold them without special inducements, such as comfortable homes, places of amusement and recreation where men can pass their idle hours and take their families, besides churches, schools and playgrounds for the children.

Only by making such provisions can isolated operations expect to obtain and hold men that are good miners. Men will often stay in a place, isolated from other centers, because of the fair treatment accorded them. Indeed, I have known miners to live in such places until their children were advanced from childhood to manhood. It is unfortunate that so many companies operating mines in isolated places pay so little attention to providing comfortable homes.

IMPROVED EQUIPMENT NEEDED

Again, speaking of places more favorably located, but not equipped in a manner to compete with larger and longer established operations in their districts, there is but one solution. A small operation, using mule haulage and employing pick miners, cannot expect to compete favorably with a larger operation equipped with up-to-date appliances for mining, loading and shipping their coal. An electric power plant, motor haulage, mining machines, etc., materially reduce the cost of production of coal and make it impossible for a mine not so equipped to compete successfully in the same market with an up-to-date operation.

On the other hand, compare two mines having like equipment, but the one being an old and long established operation, while the other is a new mine in the early stages of its development. In this instance, the advantage is with the latter mine, for the reason that a newly developed operation can put out the same tonnage at a far less cost of operation per ton of coal mined than is possible in an old mine having a greater length of haul, with more roadways and air-courses to maintain and where the work is distributed over a wide area. The newly developed mine with concentrated work, low cost of maintenance and a smaller outlay for ventilation, drainage and haulage, will prove a better paying proposition than the older mine with its heavy expenditures.

During the past 25 years, history records many times when the outlook of the coal industry has been bad. Many operators whose all was invested in the mines have regarded the situation with anxiety; but, notwithstanding, all have lived to retrieve their losses in those seasons of depression. With some of these I am personally acquainted. It is true that some large operations have been forced into bankruptcy, but these have been generally owing to causes not explained.

In closing, let me say that it is my belief that the future for each individual coal operator lies very largely with himself. If he is shrewd enough to take advantage of his opportunities and careful enough to provide against contingencies that may arise, he is taking step for step with his neighbor and need not fear competition. It is a question of good business judgment and foresight, together with providing suitable equipment and improving the efficiency of every department.

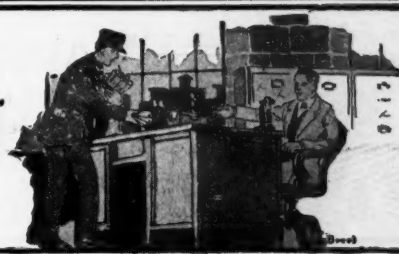
Rositer, Penn.

J. T. JONES



INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Maximum Grade in Motor Haulage

We have been using a 12-ton motor in our mine, hauling 24-car trips where the maximum grade has been 2 per cent. against the loads. The loaded cars will average $3\frac{1}{2}$ tons in weight. All of the mine cars are equipped with roller-bearing wheels and the track is in good condition the entire length of the haulage road. We anticipate a slight dip in the formation, which will probably necessitate changing the direction of the main haulage road, so as to lessen the grade against the loads. The dip of the seam will probably reach two degrees.

Kindly state what is the maximum grade that we can expect to haul the same number of loads without difficulty, and what angle will it be necessary to deflect in the line of the main road to produce such grade, assuming that the direction of the main road, at present, corresponds to the direction of the dip of the seam, or at right angles to the strike.

_____, Ky.

SUPERINTENDENT.

It is common for manufacturers of mine locomotives to estimate the tractive effort of a locomotive having steel tires and operated on steel rails, without sanding the rails, as 30 per cent. of the weight resting on the drivers. This would make the tractive effort of a 12-ton locomotive under these conditions, $0.30 (12 \times 2000) = 7200$ lb. The weight of the loaded trip in this case, is $24 \times 3\frac{1}{2} = 84$ tons, which makes the entire moving load including the locomotive, 96 tons.

Cars equipped with flexible roller-bearing wheels may be safely estimated as having a track resistance of 10 lb. per ton, making the total track resistance of cars and locomotive $10 \times 96 = 960$ lb. Then, deducting this from the estimated tractive effort of the locomotive leaves $7200 - 960 = 6240$ lb. available for overcoming the grade resistance, which is 20 lb. per ton for each per cent. of grade, or, in this case, $20 \times 96 = 1920$ lb. for each per cent. of grade. On this basis, the maximum grade for hauling 24 loaded cars is $6240 \div 1920 = 3\frac{1}{4}$ per cent.

Much will depend, however, on how closely these assumed conditions approximate the real. It is for the interest of manufacturers to estimate the track resistances at as low a figure as possible. The frictional resistance of roller-bearing wheels has been stated, by some manufacturers, to be as low as 6 or 8 lb. per ton, which, it is claimed, is the result of actual tests of such cars, made under mining conditions.

Finally, assuming the main haulage road is driven on the full dip of the seam, which it is expected will reach an inclination of 2 deg. corresponding to a grade of $3\frac{1}{4}$ per cent., in order to reduce this grade to $3\frac{1}{4}$ per cent. against the loads, it will be necessary to deflect the main road an angle of $A = 21^\circ 23'$. The cosine

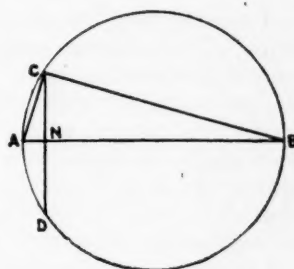
of this angle is found by dividing the percentage of grade expressed decimally by the tangent of the dip angle. Thus, $\cos A = 0.0325 \div 0.0349 = 0.9312$. To be safe, we would suggest deflecting the main road, say 30 deg., which would reduce the grade against the load to 3 per cent.

Middle Ordinate for Bending Rails

Kindly state the formula for finding the ordinate for bending iron rails to any desired radius, and show its development.

MINE ENGINEER.

Des Moines, Iowa.



According to a principle of geometry, the half-chord of any arc of a circle is a mean proportional between the center ordinate of the arc and twice the radius of the circle minus that ordinate. Thus, referring to the accompanying figure, denote the chord CD by c , the middle ordinate AN by

o and the diameter AB , or twice the radius of the circle, by $2r$.

Then, applying the principle just stated, we have,

$$o : \frac{1}{2}c :: \frac{1}{2}c : 2r - o$$

$$(\frac{1}{2}c)^2 = o(2r - o) = 2ro - o^2$$

Subtracting each member of this equation from r^2 , so as to complete the square of the second member, we have,

$$r^2 - (\frac{1}{2}c)^2 = r^2 - 2ro + o^2 = (r - o)^2$$

Again, extracting the square root of each member, we have,

$$\sqrt{r^2 - (\frac{1}{2}c)^2} = r - o; \text{ and } o = r - \sqrt{r^2 - (\frac{1}{2}c)^2}$$

While this is the exact formula for determining the middle ordinate of a chord, the length of this ordinate is so small in comparison to the length of the radius of the curve that the proportion can be written

$$o : \frac{1}{2}c :: \frac{1}{2}c : 2r$$

which gives for the value of the middle ordinate

$$o = \frac{c^2}{8r}$$

The last formula gives the value of the middle ordinate expressed in feet. Expressed in inches, this value is

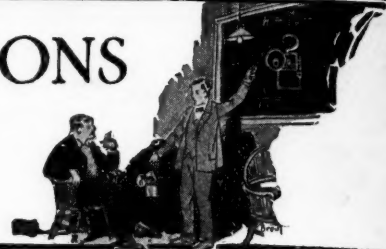
$$o = \frac{3c^2}{2r}$$

For example, to bend a rail to a curve whose radius is 50 ft. and using a 10-ft. chord, the middle ordinate of this chord is $(3 \times 10^2) \div 2 \times 50 = 3$ in. The 10-ft. cord or string must touch the gage line of the rail at each end and the ordinate must be measured from the string to the gage line.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD



Indiana Mine Bosses' Examination, Held May 24, 1919

(Selected Questions)

Ques.—What are the two purposes of coursing air currents through a mine?

Ans.—The purpose is, first, to absorb and carry away the smoke and foul gases that are produced and which would otherwise accumulate in the mine workings; and second, to supply fresh air in the working places of the mine and dilute and render harmless the explosive and poisonous gases generated therein.

Ques.—Trace the development of mine ventilation to the present time.

Ans.—In the early attempts at mining coal, no provision was made for the ventilation of the underground workings, further than to induce *natural ventilation* by diverting the surface winds into the mine, by erecting wind cowls at the opening, or causing a current of air by permitting water to fall down a shaft. Natural ventilation was also caused by providing two separate shaft openings or dividing a single shaft by means of a partition, so as to create a downcast and an upcast current by reason of the natural heat of the mine causing the warm air to rise on one side of the partition, while the colder outside air descended on the other side.

A little later, *furnace ventilation* was employed, the air in the furnace shaft being heated by maintaining a fire in the mine furnace, situated near the foot of that shaft. The heated air column in the furnace shaft caused a strong upward draft and produced a depression in the mine workings, which caused the outer air of the atmosphere to flow into the mine.

Furnace ventilation continued to be used in all of the larger mines, until the introduction of *mechanical ventilators*, in the form of large air pumps or huge air boxes or similar devices for forcing air into the mine, these devices being operated by steam or water power. Then came different types of fans, the propeller type or disk fan being simpler though less efficient than fans of the centrifugal type, having blades perpendicular to the plane of revolution. These latter were generally adopted and are now almost universally used in mining practice. They are made to operate either on the exhaust or the blowing principle, but are often arranged for both.

Ques.—(a) What is the air pressure on a square inch at sea level? (b) What is the theoretical height a suction pump will lift water, at sea level? (c) What is the practical lift of a pump and what is the difference?

Ans.—(a) The normal atmospheric pressure, at sea level, is practically 14.7 lb. per sq. in. Barometric pressure varies through a range of 1 or 2 in., depending on the approach of storm centers.

(b) Taking the pressure due to 1 ft. of water column as 0.434 lb. per sq. in., the theoretical height of action, at sea level, is $14.7 \div 0.434 = \text{say } 34 \text{ ft.}$

(c) The practical height, in feet, a pump will lift water, under ordinary conditions at sea level, may be taken at nine-tenths of the barometric pressure, in inches. Thus, the normal barometric pressure at sea level being 30 in., the normal suction lift of a pump, at that level, is $0.9 \times 30 = 27 \text{ ft.}$ It may be greater or less than this, depending on the size, inclination and condition of the suction pipe, and the condition of the pump.

Ques.—(a) Give the fundamental formulas on which mine ventilation is based. (b) Which of these are most frequently used in ventilating calculations?

Ans.—(a) There are, practically, but six fundamental or elemental formulas in mine ventilation; namely,

Unit pressure	$p = \frac{k s v^2}{a}$
Quantity,	$q = a v$
Work,	$u = q p$
Horsepower,	$H = \frac{u}{33,000}$
Rubbing surface,	$s = l o$
Resistance,	$R = p a$

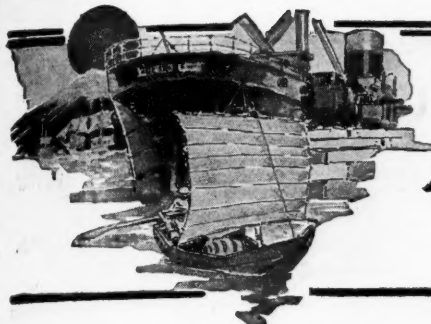
From these six formulas practically all of the important formulas in mine ventilation can be developed.

(b) The formulas for unit pressure, quantity and power are the ones most commonly used.

Ques.—(a) Compute the perimeter, sectional area and rubbing surface of an entry 8 ft. wide at roof, 10 ft. wide at bottom, 6 ft. 8 in. high and 900 yd. long. (b) How much air is passing per minute, the anemometer registering 250 r.p.m. at roof, 225 r.p.m. on each side and bottom and 300 r.p.m. in center?

Ans.—(a) To find the perimeter of this airway it is necessary to first calculate the length of each side, which is the hypotenuse of a right triangle whose sides are $6\frac{2}{3}$ and 1 ft. Thus, $\sqrt{(6\frac{2}{3})^2 + 1^2} = 6.74$, say 6 ft. 9 in. The perimeter of the airway, or the total length of the two sides, top and bottom, is therefore $8 + 10 + 2 \times 6\frac{2}{3} = 31\frac{1}{3} \text{ ft.}$ The average width of this entry is $\frac{1}{2}(8 + 10) = 9 \text{ ft.}$ The height of the entry being 6 ft. 8 in. ($6\frac{2}{3} \text{ ft.}$), its sectional area is $9 \times 6\frac{2}{3} = 60 \text{ sq. ft.}$ The length of the entry being $3 \times 900 = 2700 \text{ ft.}$, its perimeter $31\frac{1}{3} \text{ ft.}$, the rubbing surface is $2700 \times 31\frac{1}{3} = 85,050 \text{ sq. ft.}$

(b) Estimating the average velocity for the entire cross-section of this airway as, say $266\frac{2}{3} \text{ ft. per min.}$, the volume of air passing is $266\frac{2}{3} \times 60 = 16,000 \text{ cu. ft. per min.}$ The average velocity, in this case, is approximated by multiplying the observed velocity at the roof (250), by the width at the top of the entry (8); and the observed velocity at the sides and bottom (225), by the combined length of the three sides of the trapezoid ($23\frac{1}{3}$); and the observed center velocity (300), by the sectional area of the airway less its perimeter, expressed numerically ($60 - 31\frac{1}{3} = 28\frac{2}{3}$); and dividing the sum of these products by the sectional area of the airway. Thus $(250 \times 8 + 225 \times 23\frac{1}{3} + 300 \times 28\frac{2}{3}) \div 60 = 264 \text{ ft. per min.}$



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS



Great Britain's Coal Output Constantly Decreasing

A statement has recently been made by a prominent member of the Government that, owing to the continued decrease in the output of coal in Great Britain, it will be necessary either to reduce the supply of coal to industry and for domestic use or to limit exports still further. As is shown by the following table, the output of coal has been decreasing intermittently since 1910, but the most significant figures are those showing the decrease in the output per miner, which amounts to practically 10 per cent for the period mentioned:

Year	Persons Employed, Number	Total Output, Tons	Output per Person, Tons
1910.....	1,049,407	264,417,588	252
1911.....	1,067,213	271,878,124	255
1912.....	1,089,090	260,398,578	239
1913.....	1,127,600	287,411,869	255
1914.....	1,057,505	265,643,030	251
1915.....	953,642	253,206,081	265
1916.....	998,063	256,375,366	257
1917.....	1,021,340	248,499,240	243
1918.....	1,008,867	227,714,579	226

It will be seen that the output per person employed reached its highest point in 1915, when the number of men employed was smallest, but the patriotic impulse perhaps highest. From that year, however, the individual output shows an accelerating downward movement.

The output for the first three months of the present year was:

Four Weeks Ended—	Persons Employed, Number	Total Output, Tons	Output per Person, Tons
Feb. 1.....	1,064,828	18,321,100	17.2
Mar. 1.....	1,097,541	19,472,200	17.7
Mar. 29.....	1,106,299	18,676,200	16.2

On the basis of the foregoing figures the total production for this year would be about 224,000,000 tons, as compared with 227,714,579 tons in 1918; but there were nearly 100,000 more men in the mines in March than last year, and the average output per man for the present year on the basis of the March figure would be only 203 tons, against 226 tons last year. This represents a drop in total output of over 63,000,000 tons, as compared with the last pre-war year, and a drop of 62 tons in the individual output since the high-water mark was reached in the first year of the war.

The chairman and three members of the Government Coal Commission estimate the reduction in output involved in the shortening of the working day by one hour at 10 per cent in a full year. This, on the basis of the figures for the first quarter of this year, means a further reduction of about 10,000,000 tons in the year's output, which gives a total production for 1919 of some 214,000,000 tons. The fall since 1913 would thus be 73,000,000 tons—the exact amount, curiously enough, of Great Britain's coal exports in 1913. In other words, the normal surplus available for export will have been wiped out.

The official estimate of the British coal output for 1919-20, according to the British (Government) Board of Trade Journal for June 12, 1919, places the output for the first 20 weeks of 1919 at the rate of 249,000,000 tons per annum, as compared with 287,000,000 tons in 1913. The average number of men employed during the 20 weeks was 1,111,000, being exactly the same number as the average employed during the year 1913.

The average weekly output for the four weeks ending May 24, 1919, during which period there were no holidays and few stoppages, was 4,813,000 tons, or at the rate of, say, 238,000,000 tons per annum after allowing 5 per cent for holidays and stoppages.

The estimated output for the year 1919,

on the basis of the average weekly output of the first 20 weeks, and allowing for the reduced hours after July 16, is, say, 230,000,000 tons; or, calculated on the weekly output for the first 20 weeks, the output for the remainder of the year being estimated on the average weekly output for the four weeks ending May 24, with an allowance of 5 per cent for holidays and stoppages, the total is some 228,000,000 tons.

The output for 12 months from July, 1919, after the reduced hours have come into force is estimated at 217,000,000 tons, calculated on the output of the first 20 weeks, or 214,000,000 tons, calculated on the weekly output of the four weeks ending May 24, 1919, with an allowance of 5 per cent for holidays and stoppages.

The consumption of coal for inland purposes and bunkers was 210,000,000 tons in the year 1913 (the average for the five pre-war years was 209,000,000 tons), and for the year 1918 was 196,000,000 tons. The exports of coal in the year 1913 were 77,000,000 tons, and in the year 1918, 34,000,000 tons. In order to provide approximately the same quantity of coal for inland consumption and bunkers for 12 months from July, 1919, all present restrictions on consumption must be fully maintained, and, in addition, exports must be reduced from a rate of 34,000,000 tons per annum to a rate of 23,000,000 tons per annum.

It is estimated that the deficiency on the working of the industry on the basis of the estimated outputs given for the period of 12 months from July, 1919, after providing guaranteed profits to owners at the rate of 1s. 2d [\$0.284] per ton, will be about £46,600,000 [\$226,779,000], equal to 4s. 3d. [\$1.03] per ton of output. For the calendar year 1919 it is estimated that the deficiency will be £37,000,000 [\$180,060,000].

Yorkshire Coal Mining Industry

More coal is mined in Yorkshire than in any other county in Great Britain. The two great coal-producing areas are known as the South Yorkshire and the West Yorkshire coal fields. The former embraces 78 collieries in the neighborhood of Barnsley and Doncaster in the Sheffield district, and the latter consists of 65 mines in the neighborhood of Wakefield, Normanton and Castleford, in the Leeds district. The production of the West Yorkshire coal fields in 1918 is estimated to have been 15,000,000 tons, and that of the South Yorkshire area 25,000,000 tons, a total production for Yorkshire County of 40,000,000 tons, or about one-sixth of the total amount of coal estimated to have been mined in Great Britain in 1918.

The statistical office of the customhouse has now resumed publication of its returns of coal shipped to foreign countries and the British possessions from the various districts in the United Kingdom. The total shipments of coal from all ports in Great Britain were 59,039,880 tons in 1914, 43,534,560 tons in 1915, 38,351,553 in 1916, 34,995,587 in 1917, and 31,752,904 in 1918.

Since the war began every demand of the colliers has been conceded in order that production should not be interfered with. From Aug. 14, 1914, to Oct. 31, 1918, 399,435 coal miners joined His Majesty's forces, according to a statement of the acting chief inspector of mines at the Home office, London, and up to Jan. 31, 1919, 198,612 had been released. The effect on the output has been very serious, although actual tonnage comparisons do not show it to the full extent, as previous to 1915 a very large loss in output was caused by short-time working at house and gas-coal pits in the summertime, in some cases not more than two days a week being registered. Since the beginning of 1915 pits in most districts have been fully employed, the exceptions being in the South Wales and Newcastle areas.

According to the latest official report of

the acting chief inspector for mines and quarries to the Home Office the production of coal in 1917 of the four leading counties in the United Kingdom was as follows: (1) Yorkshire, 40,874,522 tons, made up of North Riding, 1909 tons, West Yorkshire coal fields (Leeds district), 14,860,067 tons, and South Yorkshire coal fields (Sheffield district) 26,012,546 tons; (2) Glamorgan (Swansea district), Wales, 32,133,288 tons; (3) Durham (Newcastle district), 30,842,539 tons; and (4) Lancaster (Manchester district), 21,759,859 tons. The total output of coal in the United Kingdom in 1917 was 248,499,240 tons, valued at £207,786,894 (\$1,011,194,920).

The recent prosperity of the coal trade was the direct result of conditions arising out of the war and the advantage accrued mainly to the workers, whose wage advances by means of war bonuses, etc., have been very substantial since the war began and are now considerably higher than at any previous time. Many colliers provide houses at low rents for their workmen, besides which they are entitled to house coal free or at a merely nominal price. Not content with these conditions, the Miners' Federation is now formulating demands for a six-hour day, a fortnight's holiday every year with pay, and a further substantial advance in wages (30 per cent, has been suggested).

The *Iron and Coal Trades Review*, commenting on present conditions in the trade, says:

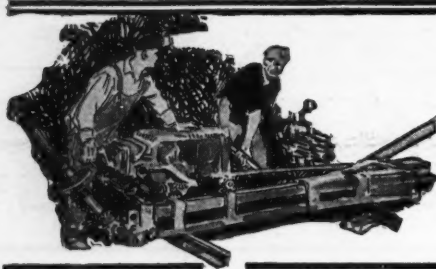
"It is advisable, under the circumstances, to draw the attention of the Miner's Federation to the fact that other countries are large coal producers and that interested circles in America—where it might be mentioned the output per man per day is more than twice as much as in this country—are already formulating schemes to enter into competition for business at European ports. It is reported that branch offices are to be opened in Paris and Genoa. It has been our habit to look to France and Italy as our own special markets, but when it is pointed out that coal has already been offered by American coal-exporting firms at prices c. i. f. Genoa which are not very different from the figure quoted for the best-grade steam coals from this country, it looks as though the Americans, with their usual thoroughness, are out for business as soon as restrictions are withdrawn, and as they will have a proportionately larger supply of carrying tonnage than we have, they may become very formidable competitors.

"With severe competition from this quarter and also from Germany (if no restrictions are placed on its export trade by the Peace Conference), the Miners' Federation of Great Britain will do well to further seriously consider matters before placing any more harassing restrictions on the coal trade of this country."

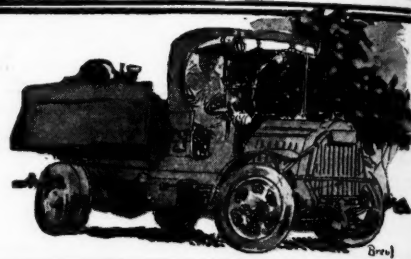
The Coal Controller is already allowing some abatement of the rigid restrictions of the household fuel and lighting order, and commencing with Jan. 1919, the allowance of gas and electricity to consumers has been increased by 25 per cent.

The opinion of competent authorities is that there will be a huge demand for British coal for several years, especially from the near continental neutrals—Sweden, Norway, Denmark and Holland—which since the war have obtained only limited supplies of coal, under license and in exchange for their own products. Consequently, prices are expected to keep up.

Vice Consul Augustus I. Hasskari reports from Rio de Janeiro, under date of May 23, that total imports of coal into Brazil during April amounted to 75,688 metric tons (1 metric ton equals 2204.6 pounds). Of this amount the United States furnished 64,153 tons and the United Kingdom, 11,534 tons. During the corresponding month, 1918, the United States supplied 12,042 tons, and the United Kingdom, 31,826 tons. In April, 1917, the United States furnished the total imports, 56,761 tons.



COAL AND COKE NEWS



Pittsburgh, Penn.

Shortage of coal cars in western Pennsylvania to be relieved by thousands of new cars. Question of price argued by Railroad Administration and private owners of railroads while country faces fuel shortage.

The false shortage of coal cars which has caused unrest among mining men and loss to coal and steel companies will be relieved shortly by the placing of upwards of 16,000 cars in service says a Pittsburgh authority. These cars are now held in storage awaiting a settlement of the difficulties that have arisen between the Railroad Administration and the owners of the various roads, over the price to be paid for such cars. Several thousand other cars are expected to be transferred from the West and the extreme East for service in western Pennsylvania. When the whole situation clears up it is expected that the car shortage will be at least temporarily relieved.

The new cars were built for the Government at a price greatly in advance of the prevailing price for cars in normal times. Private owners of railroads claim that the purchase of these cars at their contract price would be a hardship and have refused to accept them. The cars have been in storage since about the time of the signing of the armistice. More than 4000 of these cars are said to be stored in or near Pittsburgh and may be put in use by local railroads. Plans looking to the prompt use of the cars is understood to have been brought about by strong pressure on the Railroad Administration by the National Coal Association and the steel industry.

Charleston, W. Va.

Pronounced car shortage throughout most of West Virginia fields. Mines working about half time. Tidewater embargo continues on Kanawha coal. Navy takes over large quantities of smokeless.

Production was knocked galley west during the week ended July 26 in most of the producing fields of West Virginia by a most pronounced shortage of cars in all such districts, spoiling plans for a large production during the month and making it impossible for producers to even come anywhere near to taking care of the demand. Cars were so hard to secure that a large number of mines either found it necessary to shut down altogether or to operate during only a portion of the week. In some sections the supply was restricted to about 33 1/2 per cent. while in others it dwindled to the extent of 20 per cent. Every railroad operating in the state was short of cars. Railroad officials ascribed the shortage to the fact that there was a congestion of loaded coal cars on eastern lines which it had been impossible to deliver to tidewater destinations and consequently to unload, the result being that hundreds of cars could not be returned empty. There has been little shipping in the coastwise trade for several weeks and little hope is held out that prevailing car conditions will be improved for the present. Government hoppers have not been delivered to the railroads for service although it had been indicated that a large portion of such cars (which have been idle) would be put in service by the last of July. With such car service it is utterly impossible for producers to fully supply an ever increasing demand in every field, for all kinds of coal mined in the state. There was an exceptionally strong demand for gas and splint coals, but steam coal also shared in the general increase of activities in the coal markets of the country. And while two weeks ago buyers were fighting shy of contracts, it is now the producers who are in no hurry to bind themselves to contract deliveries at a stipulated price. The embargo against gas and splint coal to tidewater imposed on July 7 was still in effect on July 26, with nothing to indicate just when it would be lifted.

With the supply of cars in the Kanawha field reduced to about 50 or 60 per cent. of the normal supply, mines in that field were greatly handicapped during the week ended July 26 and were unable to operate in many cases as much as half time. Operators viewed the shortage with concern because of the way it was interfering with a prompt filling of orders which are pouring in in such heavy volume. The tidewater embargo shut off shipments to the seaboard, but the impetus given to the production of steam coal had to some extent balanced the tidewater losses. Producers declare that the demand for all kinds of fuel produced in the Kanawha region to be most insistent with facilities for taking care of such a demand somewhat limited.

Production of New River smokeless was retarded materially during the week ended July 26 by a most pronounced car shortage; the output of New River coal being restricted to about 50 or 60 per cent. of possible production during a period when there was a most urgent demand for such coal, at home and abroad. Large quantities of New River coal are now being taken over by the Navy.

Fairmont, W. Va.

Most serious car shortage in Fairmont region. Mines working on short time. Marine strike the cause. Nova Scotia taking large quantities of Fairmont coal.

The most serious car shortage of the present year, and in fact in several years, was experienced in the Fairmont and other producing fields in the northern part of the state during the week ended July 26, the supply of empties being cut down during part of the week at least two thirds. The result was that 80 mines on the Monongah division alone of the Baltimore & Ohio were unable to continue operations at the end of the week because of lack of cars; out of a total of 235 mines on that division, only a little more than 100 found it possible to produce. The car shortage was caused by the large number of coal cars awaiting delivery at tidewater where no coal could be unloaded because of the marine strike. For that reason the total equipment available was shortened by at least 10,000 cars. The car shortage arrived at about the same time a further increase in demand was felt in northern West Virginia for both prepared sizes and slack. Even in the face of an embargo to tidewater piers it would have been possible to have maintained production but for the car shortage in view of the increased activities in steel coal and the better movement of slack as well as because of a somewhat heavier movement of coal to the Lakes. On the other hand railroad fuel shipments were not as heavy in volume as during the earlier part of the month. Owing to the shortage of cars the output in most northern fields, was cut down at least one half. Much Fairmont coal, it is understood, is being shipped to Nova Scotia where it is being used in large quantities by the Canadian Pacific and other railroads in the Dominion of Canada.

Huntington, W. Va.

Serious car shortage in Logan field. Production 55 per cent. of capacity. Steady growth in New River output in April, May and June. Car shortage decreases July production.

One of the most serious car shortages of the present year in the Logan mining district was that experienced during the week ended July 26 when the production of 134,000 tons of coal was lost because no cars were furnished in which to load coal. The tonnage lost from the same source during the previous week amounted to 46,000 tons. Between July 19 and 26 there was an increase of 88,000 tons in the

production loss through a car shortage alone; the increase in percentage being from 15 to 37 per cent. of full time capacity. This reduced total production to a fraction more than 55 per cent. of full time capacity as against 71 per cent. in the previous week; production being cut down from 219,000 to 200,000 tons, so that the total output was short about 53,000 tons of the tonnage loaded during the corresponding week in 1918. Lack of equipment was altogether responsible for limiting working time in the mines to 3300 cars as compared with 4200 cars for the week ended July 19—a loss of about 900 cars. Losses from labor shortage and from mine disability were comparatively light and a percentage of loss from the production from no market was only 5.41 per cent. or 19,000 tons. The total production loss for the week was 162,000 tons.

Figures compiled by the Chesapeake & Ohio Ry. show a steady growth in the output of the New River district for the months of April, May and June; but it is very much feared that owing to the pronounced car shortage in evidence during the latter part of July that the output for that month will show a material decrease as compared with previous months. The tonnage loaded in the New River field for each of the first six months of the year is as follows: January, 388,000; February, 425,000; March, 302,000; April, 497,000; May, 597,000; June, 596,000. Producers are inclined to believe that when figures are finally compiled, they will show July production to have been about 200,000 tons short of that for either May or June.

Bluefield, W. Va.

Increase in Pocahontas production—car shortage more than offset by labor improvement. Production reaches new high total in Kenova-Thacker field—77 per cent. of capacity.

Contrary to general expectations there was an increase instead of a decrease in the coal production of the Pocahontas district during the week ended July 26, although there was an increase in the shortage of empty cars for the week. Despite such a shortage, however, mines of the district succeeded in getting out a larger tonnage of coal by 20,000 tons, production reaching 337,000 tons as against the previous week's production of 317,000 tons, the output in fact being only 5000 tons below the high production of July 12. The gain in the amount of coal mined and shipped was due to the fact that miners were able to work over a longer period and also to a slight improvement in the labor situation. The production loss as a whole was only increased about 10,000 tons or from 55,000 to 65,000 tons; the largest part of such loss being due to an increase in the car shortage from 24,000 to 39,000 tons. Such a loss was offset in part by a reduction in the loss through labor shortage of 2000 tons and a reduction in the loss through mine disability of 4000 tons. Much coal from the Pocahontas field was being shipped to western and northwestern markets during the week, particularly to Wisconsin markets. There was a slight reduction in the tonnage of coal coked, only 6000 tons being coked during the week.

A car shortage, so prevalent in other fields of West Virginia, was scarcely felt in the Kenova-Thacker district during the week ended July 26, although there was a slight increase over the previous week. It had no effect on the output as production reached a new high total for the year—142,000 tons—almost equal to the production (149,000 tons) for the same period last year and an increase of 17,000 tons over the week ended July 19. Increased working time in the mines, amounting to about 100 hours, made the increase in production possible. A shortage of cars failed to make any difference in mining and

loading coal; the increase in the loss from lack of cars being only about 4000 tons and amounting to about five per cent. of full time capacity. The percentage of loss from labor shortage was also reduced affecting production only to the extent of six per cent. While there was a slight increase in the tonnage loss from no market, the percentage of such loss to full time capacity was slightly reduced. In short, mines of the Kenova-Thacker district were able to produce up to about 77 per cent. of capacity.

Louisville, Ky.

Meeting of southern coal operators' associations. Car distribution, coal shortage and car repairs discussed. C. D. Boyd to confer with Director General Hines.

Officers and members of six of the leading coal associations operating south of the Ohio River were gathered at the Seelbach Hotel, Louisville, on August 1, to discuss traffic matters and the car shortage which is spreading rapidly throughout the southern coal fields. A considerable amount of statistical information on the subject was presented by C. D. Boyd, traffic manager for three of the associations, and formerly coal traffic manager for the Louisville & Nashville R.R.

It was shown that the mines were not securing an equitable distribution of cars; that there was a serious car shortage, due in part to cars being under long hauls to the North and Northwest; and that under the U. S. Railroad Administration's curtailment policy, cars were not being properly repaired and kept in operation. At the conclusion of the meeting C. D. Boyd was instructed to make a trip to Washington immediately to confer with Director General Hines in an effort to secure relief, and improve certain existing conditions.

The associations represented were the Southern Appalachian, Harlan, Hazard, Alabama and Virginia Coal Operators' associations and the West Kentucky Conservation Association.

McAlester, Okla.

Coal operators of Oklahoma move against cheap fuel oil of Mexico. Affiliation with National Coal Association. Cheap petroleum displacing coal in certain markets. Protective tariff sought.

Affiliation with the National Coal Association, as a means to save the Oklahoma coal mining industry from being strangled to death by cheap Mexican oil was the principal business before the meeting of the Oklahoma Coal Producers' Association at the special session held at McAlester on July 25. This move was discussed at a recent meeting of all the state's coal operators in Muskogee. No action could be taken at that time officially as it was necessary that the matter be stated in the call sent out for the meeting.

Since that meeting, about a month ago, the price of Mexican oil has dropped from 65 to 19c. a barrel, it is reported. Only a prohibitive tariff will protect their business from this killing competition, the operators say. The oil costs less than the freight to most of the points in the territory supplied by mines in eastern Oklahoma. Cheap petroleum from the southern republic is displacing coal all along the Gulf and Atlantic coasts and is becoming strongly entrenched in New England it is said.

The purpose of the meeting at McAlester was to enlist the influence of the powerful National Coal Association in Washington for a high protective tariff against Mexico's fuel product. This assistance has already been pledged; it remains only to consummate the formality of joining the state body to the national association.

PENNSYLVANIA

Anthracite

Wilkes-Barre—The famous Parrish breaker of the Lehigh & Wilkes-Barre Coal Co. is now only a memory. This old breaker had been a landmark in the Wyoming Valley for many years.

Hazleton—It was announced by coal operators here recently that bottom men at various collieries would be furnished with steel helmets similar to those worn by men in service in the late war. These "Bessemer derbies" should offer considerable head protection to men working at the foot of slopes and shafts from pieces of coal rolling down or falling off cars being hoisted out of mines.

Reading—The 15th convention of the Pennsylvania Retail Coal Merchants' Association was held here during the week ended July 26. The membership includes coalmen from four adjacent states, most of whom deal exclusively in anthracite. This convention was of unusual importance as the dealers are now resuming full control of their business after the era of Federal administration. A lengthy report covering all phases of the coal situation, as viewed by a retailer, was given by the secretary, which includes the following points: There is no likelihood that present anthracite prices will be reduced this year. If the miners win higher wages, higher prices will follow. Early buying is essential. Governor Sproul's plan for municipal coal yards is not practical.

Wilkes-Barre—The Susquehanna Collieries Co., operating coal properties in Dauphin, Schuylkill, Northumberland and Luzerne counties, has filed a mortgage for \$11,000,000 in the counties affected to replace a \$9,000,000 mortgage, the Girard Trust Co., of Philadelphia, being the holder of the mortgage in both cases. Counsel for the company in Dauphin County, has given the statement that electrification of the mines at Williamstown and Lykens, and the sinking of a shaft at Big Lick, between Lykens and Wiconisco, will shortly be started, the cost being from \$2,000,000 to \$3,000,000, and the necessary time two years. The new shaft is expected to reduce the present heavy expense of long inside hauls for coal, and to cut the cost of removing water from the mines.

Bituminous

Latrobe—Fire of incendiary origin destroyed the stables and other property of the Oakwell Coal and Coke Co., near here recently. Horses were burned to death and a total loss of several thousand dollars reported.

Homer City—Recently J. B. Hutchinson, superintendent of the Conemaugh division of Pennsylvania R.R., inspected the Yellow Creek branch. It is rumored that some new coal development will be made up the creek and the branch will be extended to haul the outputs from the mines.

Washington—The Imbire Coal Mining Co. of this place, is just completing its new slope mine at Nichola. It will be equipped with electrical machinery at a cost of \$50,000 and have an output of 500 tons a day. W. F. Taylor is superintendent of the work.

Washington—The Vesta Coal Co., of Pittsburgh, has just purchased 552 acres of coal land in eastern Washington County from the estate of Joseph Utery for \$193,000 or at the rate of about \$350 an acre. The Vesta company has large holdings adjoining the tract.

Brownsville—The engineering departments of the various Hillman companies, with the exception of J. Dickerson Martin, Chief Engineer (who will remain in Pittsburgh) have moved headquarters from Pittsburgh and Masontown, Penn., to South Brownsville, Penn. The Hillman companies include the Hillman Coal and Coke Co., Merchants' Coal Corporation, Hecla Coal and Coke Co. and Thompson-Connellsville Coke Co. The general offices of the Hecla Coal and Coke Co. and the Thompson-Connellsville Coke Co., in Pittsburgh, are being moved from the Oliver Building to the First National Bank Building where the Hillman Coal and Coke Co. and Merchants' Coal Corporation have been located. The combined offices will occupy two floors.

WEST VIRGINIA

Fairmont—The Fairmont Mining Machinery Co. has been re-organized in so far as the executives of that company are concerned by the election of Walter D. Stockley, as president; J. M. Boyle as vice president; and Messrs. Stockley, Boyle, F. R. Lyon, Sprigg D. Camden, A. T. Watson and A. S. Denham as directors. Such reorganization is a part of the policy initiated by Col. C. W. Watson in again assuming the presidency of the Consolidation company, of decentralizing the management not only of the Consolidation company but of companies identified with it.

Plymouth—The Plymouth Coal and Mining Co., with an operation on the Kanawha River about twenty miles from here, has just sunk a shaft 145 ft. deep to a 5- to 7-ft. seam, the shaft having been completed in 57 days. This shaft will facilitate development of the company's holdings of about 7000 acres of coal land. The Plymouth company was consolidated not long

ago with the Hatfield companies, with headquarters in Cincinnati, Ohio, (a river transportation company being one of the concerns absorbed); the bulk of the coal from Plymouth will be shipped by water to Cincinnati and other points down the Ohio River.

Charleston—According to the amount report of the West Virginia Department of Mines for the fiscal year ended June 30, 1917, (just published), there were 1203 producing mines in the state during that period, operated by 667 companies and firms, the production from which for the fiscal year was 79,806,652 gross tons, or an increase of 194,354 gross tons representing less than one per cent. of the gain over the previous year. The value of the coal produced greatly exceeded that for the year ended June 30, 1916. The total value of all coal produced during the year ended June 30, 1917, in West Virginia, was \$180,363,033.52, the increase of the value in the product over the previous year being \$87,969,481.03; the coke produced during the same period showing an increase in value of \$7,972,880.58. There was an increase in the average selling price of coal in West Virginia during the year ended June 30, 1917, of \$1.17 per ton over the price prevailing during the previous year; the average selling price of coal throughout the year being \$2.26 per gross ton for run-of-mine coal. The average price of coke, f.o.b. ovens during the year was \$4.77 per ton, which represented an increase over the previous year of \$2.76 per ton. Although the miners worked a shorter number of days and produced less coal per man during the year, yet their earnings were larger by 28.8 per cent.

KENTUCKY

Louisville—The Harlan County Coal Operators' Association and the Southern Appalachian Coal Operators' Association are making a determined bid for lower freight rates to Charleston, S. C., and Savannah, Ga., to enable them to handle coal at competing rates to southern Atlantic ports for export. The matter was recently taken up with the U. S. Railroad Administration, and the Louisville Freight Traffic Committee. It is estimated that Europe will be a large buyer of American bituminous coal for the next few years, due to the mining situation in France, Germany and England and the western Kentucky operators are anxious to get in on the movement, and establish a foreign demand for their product.

OHIO

Martins Ferry—The Youghiogheny & Ohio Coal Co. has started the building of approximately 50 dwellings at its Dorothy mine near Yorkville. The company is also erecting a store.

Akron—The Murray Hill mine of the Akron Coal Co. was destroyed by fire recently. The work of rebuilding is progressing and officials of the company state that they expect to dump coal in a temporary tippie early in August.

Columbus—Practically all of the mines of the Sunday Creek Coal Co. (33 in all) located in the Hocking Valley field are now in operation, according to P. A. Coen, acting president of the company. While the company has large steam and railroad contracts, still a large part of the output is taken by the domestic trade.

Columbus—Ohio coal mines are said to be operating from 65 to 75 per cent. of full time as compared with 45 per cent. three months ago, when thousands of miners were idle. Practically all mines in eastern Ohio are said to be working nearly full time. In the Hocking Valley or southern Ohio district some mines are still closed down and others working only part time, but conditions are improving rapidly. Approximately 15,000 of the 50,000 miners of the state were idle from the signing of the armistice until three months ago it is said. The demand for coal is becoming better and unless a car shortage and severe winter intervenes, all mines are expected to run full time shortly.

INDIANA

Indianapolis—In a recent decision handed down in the suit of the Lower Vein Coal Co. and seventy-one other Indiana coal mining companies for a permanent injunction against the Indiana Industrial Board to prevent it from enforcing the amendment to the Indiana Workmen's Compensation act, Federal Judge Anderson has ruled that this amendment is constitu-

tional under both Federal and state laws. A temporary injunction granted early in the present year, which prohibited the Industrial Board from passing on petitions for compensation of coal miners filed with it, was dissolved. The amendment was attacked on the ground that it was class legislation, as it provided that it was mandatory for coal mining companies and municipalities to come under the law.

ILLINOIS

Zeigler—The Bell & Zoller Mining Co. has recently bought a 750-K.W. steam turbo-generator and three motor-generator sets to improve the power distribution in its mine.

Carterville—The "Dale" mine of the Duncan Coal Co., recently resumed operations after being shut down since last February. T. S. Cousins of Duquoin is general superintendent of this mine and of two other large mines in southern Illinois, one at Johnston City and one at Duquoin.

Duquoin—Engineers are at work in the southern part of Jefferson County, surveying that section for the location of a branch line which is to be an outlet northward for the coal fields of Williamson and Franklin counties. The work is to be done by the Illinois Central R.R. At the present time the Burlington is carrying the larger portion of the coal from this district and another outlet is needed.

Harrisburg—A general resumption of mining activities throughout southern Illinois is expected during the month of August according to C. M. Moderwell, general manager of the O'Gara Coal Co.; this company operates many mines in Saline County. He has announced that there will be a marked improvement in the production of that company's mines as well as others in the district unless a car shortage proves too great a detriment to the industry.

Marion—A mining case was recently decided in the County Court of Williamson County between the State and the Johnston City & Big Muddy Coal Co. The company recently sank a shaft and failed to construct an air or escape shaft; instead connecting the new mine with old workings of the company on adjoining property. The injunction, which was sustained, was to prevent the company from operating the new shaft until another shaft had been sunk and opened up for use.

Granite City—Ground was recently broken by the St. Louis Coke and Chemical Co., near here (Madison County), for the erection of a large steel and coke plant. The plant will cover 500 acres of ground and will cost about \$10,000,000 it is said. Approximately 2000 tons of coal from the southern Illinois coal fields will be handled daily in the 80 coke ovens which are to be installed. A blast furnace with a capacity of 500 tons will be constructed and the products of this furnace and steel plant will be used by the mills which are located near Granite City.

The location of the plant has many advantages, being directly on the Litchfield & Madison R.R., and the Illinois Traction System; a belt line will be built connecting the plant with the Terminal Railway Association of St. Louis. The distance from the heart of the Illinois coal fields to the proposed plant is not over 30 miles and this will make transportation of the coal quite cheap. There are also some 10 or 15 separate railroad lines which pass near Granite City, terminating in East St. Louis and St. Louis. The Mississippi River barge fleet will be utilized both for bringing iron ore from the Lake Superior region and for distributing the finished products of the company.

In addition to the manufacturing of coke and steel, the plant will turn out byproducts, among them dyestuffs. Owing to its close location to Illinois coal fields, the company expects to produce steel cheaper than is now being made in Pittsburgh.

ALABAMA

Birmingham—Teams are being trained at many of the coal mines in this district in first-aid and safety-first work, and practically all the larger companies will send picked teams to the National field meet to be held at Pittsburgh, Penn., Sept. 30. The mine rescue car from the local station of the Bureau of Mines has visited the mines and given the men training in mine rescue work, under the direction of District Mining Engineer W. B. Plank and Foreman Miner James M. Cobb. It is also probable that a field meet will be held this fall under the auspices of the Bureau of Mines and the Alabama Coal Operators' Association, at which time contests will be held between teams from this district.

IOWA

Melcher—The Red Rock Coal Co. of this place, has installed the following equipment: A Jeffrey fan driven by a General Electric motor; two 6-ton Goodman electric locomotives; four Goodman mining machines; one 200-K.W. Ridgeway generator, also 100 hp. additional boiler capacity. The capacity of the mines is to be increased from 1000 to 1500 tons per day.

MISSOURI

Jefferson City—The Missouri Legislature, at its recent session, gave official recognition to Missouri as a coal producing state by inserting in the general appropriation bill a clause requiring that for the biennial period 1919-1920, preference shall be given to Missouri coal, quality and cost considered, in purchases for the state sanitariums, the soldiers' homes and other state institutions. It is estimated that the coal for the period will cost \$340,000. Missouri's coal industry gave employment in 1918 to 9000 miners and about an equal number of other persons in connection with the industry.

Personals

Joseph Maize, who recently resigned as superintendent of the Edna mines of the Hillman Coal and Coke Co., near Irwin, Penn., has accepted the position of superintendent of the Graff Mining Co. near Blairsville, Penn.

Phillips F. Jarvis has resigned his position as sales manager for the territory controlled from the St. Louis office of the Sullivan Machinery Co. In the future this territory is to be subdivided and the following appointments are announced:

Marion C. Mitchell is sales manager for Indiana and Illinois with temporary headquarters at St. Louis. Don M. Sutor, formerly at El Paso, is sales manager for western Kentucky, western Tennessee, Missouri, Arkansas and Kansas with headquarters at St. Louis. Dan H. Hunter is sales manager for Louisiana, Texas (except the southwestern section) and the oil fields of Oklahoma and Kansas, with headquarters at Dallas, Texas.

S. P. Kuntz, formerly mine foreman at one of the operations of the Madeira-Hill Coal Mining Co., in Clearfield County, Penn., has resigned. Mr. Kuntz plans to develop a tract of coal land at Clover Run, near Mahaffey, on his own account.

H. G. Nash has been appointed manager of the Huntington district, Mine Car Department, of the Hyatt Roller Bearing Co. **H. D. Hynds** has also been assigned to the same district; he will devote his time to the solving of haulage problems for those operators desiring such assistance.

Thomas O. Morgan, until recently head of the service department of the New York office of the American Steam Conveyor Corporation, has been promoted to the position of sales engineer. This corporation also announces the appointment of **H. S. Valentine** as sales engineer in charge of its Philadelphia office.

Ralph E. Sunderland, vice president of the Colonial Coal and Timber Corporation, formerly of Omaha, Neb., now of Charleston, W. Va., and Mrs. Alma S. Pendleton, of Charleston, were united in marriage July 18, leaving shortly after the ceremony for a trip through the West. For the past year Mrs. Pendleton had been an attaché of the West Virginia Department of Mines.

Ernest P. Kipp is the district manager in charge of the new sales office and warehouse opened up by the Hazard Manufacturing Co., (headquarters at Wilkes-Barre, Penn.), at Denver, Colo. The Denver office will cover the Inter-Mountain district, including in its territory the states of Colorado, Wyoming, Montana, Idaho, Utah, New Mexico and the western portions of Nebraska and South Dakota.

Professor H. H. Stock, head of the Mining Department of the University of Illinois, spent two weeks recently at the Pittsburgh Station of the Bureau of Mines and in the Connellsville coke region. Professor Stock investigated the methods of mining of western Pennsylvania in the interest of the state of Illinois with a view of improving the mining methods and gaining a greater recovery from the coal beds of Illinois.

J. J. Brown, formerly vice president and general manager of the Wheeler Condenser and Engineering Co., of New York, was

elected president of this company. He succeeded Charles W. Wheeler, recently deceased. **H. S. Brown** was elected vice president. The business of the Wheeler company has more than quadrupled during the past ten years and the manufacturing capacity of the plant has been correspondingly increased.

R. R. Shafter has returned to the Sales Department of the Traylor Engineering and Manufacturing Co., of Allentown, Penn.; he will have charge of the company's New York office at 30 Church St., in the capacity of district manager. For two years Mr. Shafter was general superintendent of the Traylor Shipbuilding Corporation, which under his management completed more 3500-ton cargo carriers than any other yard on the Atlantic and Gulf coasts.

Lieutenant Commander John L. Murrie, U. S. Navy, formerly of the New York Edison Co., and **Captain Edward F. McCrossin**, U. S. Army, formerly of the McCrossin Engineering Co., have been relieved of active duty in the Government service and announce the formation of the firm of Murrie & Co., engineers, with offices at 74 Broadway, New York. In addition to general consulting engineering, the firm specializes in engineering and financial reports on railroads, gas and coal byproduct plants and gas and electric rate cases.

Obituary

Thomas Jefferson McCowan, 72 years of age, a large owner of coal and timber lands in eastern Kentucky, recently died at his home at Penny, Ky. Mr. McCowan for many years was one of the big operators of the district, later retiring and taking up the ministry. He is survived by two sons and three daughters.

H. J. Wheeler died on July 18. He had been with the North East Coal Co., of Paintsville, Ky., for a number of years as chief electrician. In 1917 he opened up (with associates) the Salt Lick Coal Co., on Beaver Creek. Mr. Wheeler had acted in the capacity of mine foreman until July 1 when he was promoted to the position of superintendent of power having charge of all the mechanical and electrical equipment of the Wells-Elkhorn Coal Company.

Coming Meetings

The United Mine Workers will hold a convention at Cleveland, Ohio, beginning Sept. 9.

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

New York Coal Merchants' Association will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

National Exposition of Chemical Industries will hold its first annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The Tennessee Mine Foremen Association, Southern Appalachian Coal Operators' Association, Tennessee Mine Inspectors and the United States Bureau of Mines will hold a miner's field day and first-aid contest at Jellico, Tenn., Aug. 23.

Publications Received

Annual Report of Coal Mines of State of Washington for Year Ending December 31, 1918. James Bagley, State Mine Inspector, Seattle. Unillustrated; pp. 62; 6 x 9 inches.

Thirty-seventh Annual Coal Report of Illinois. Department of Mines and Minerals, Springfield, Ill. For the fiscal year ended June 30, 1918. Illustrated; pp. 306; 6 x 9 inches.

Bibliography of Petroleum and Allied Substances in 1916. By E. H. Burroughs. Bulletin 165. Department of the Interior, Bureau of Mines. Unillustrated; pp. 159; 5½ x 9½ inches.

Monthly Statement of Coal-Mine Fatalities in the United States. April, 1919. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated; pp. 13; 6 x 9½ inches.

War Gas Investigations. Bulletin 178-A. Advance chapter from Bulletin 178 War Work of the Bureau of Mines. By Van H. Manning. Department of the Interior, Bureau of Mines. Unillustrated; pp. 39; 5½ x 9½ inches.

The Determination of Combustible Matter in Silicate and Carbonate Rocks. By A. C. Fieldner, W. A. Selvig and G. E. Taylor. Department of the Interior, Bureau of Mines. Technical Paper 212. Illustrated; pp. 22; 5½ x 9½ inches.

The Decline and Ultimate Production of Oil Wells, with Notes on the Valuation of Oil Properties. By Carl H. Beal. Department of the Interior, Bureau of Mines. Bulletin 177. Petroleum Technology 51. Illustrated; pp. 215; 5½ x 9½ inches.

Recent Developments in the Absorption Process for Recovering Gasoline from Natural Gas. By W. P. Dykema. Department of the Interior, Bureau of Mines. Bulletin 176. Petroleum Technology 50. Illustrated; pp. 90; 5½ x 9½ inches.

Petroleum Investigations and Production of Helium. By Van H. Manning. Department of the Interior, Bureau of Mines. Bulletin 178 C. Advance chapter from Bulletin 178 War Work of the Bureau of Mines. Unillustrated; pp. 87; 5½ x 9½ inches.

Burning Steam Sizes of Anthracite With or Without Admixture of Soft Coal. Department of the Interior, Bureau of Mines. Technical Paper 220. Reprint of Engineering Bulletin No. 5. Prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Illustrated; pp. 8; 6 x 9 inches.

Recent Coal and Coke Patents

Furnace. H. Batchelor, Sheridan, Wyo., 1,296,906. Mar. 11, 1919. Filed May 28, 1915. Serial No. 30,980.

Mining Machine. E. O'Toole, Gary, W. Va., 1,283,880. Nov. 5, 1918. Filed Feb. 24, 1913. Serial No. 750,218.

Mechanical Underfeed Stoker. C. Erith, London, England, 1,298,189. Mar. 25, 1919. Filed Jan. 13, 1915. Serial No. 1,907.

Mining Car Coupling. N. Mandabach, Vincennes, Ind., 1,298,238. Mar. 25, 1919. Filed Oct. 7, 1918. Serial No. 257,304.

Skid for Mining Machines. G. Dobson, Palisades, Col., 1,298,304. Mar. 25, 1919. Filed Apr. 30, 1918. Serial No. 231,721.

Safety Stop for Mine Cars. J. Klansnic, Black Diamond, Wash., 1,297,575. Mar. 18, 1919. Filed Jan. 31, 1918. Serial No. 214,618.

Automatically Operated Mine Gate. S. W. Warman, Brownsville, Penn., 1,299,074. Apr. 1, 1919. Filed Aug. 31, 1917. Serial No. 189,179.

Adjustable Clamp for Side Rails in Mines. H. F. Heumann, Marissa, Ill., 1,298,946. Apr. 1, 1919. Filed Dec. 6, 1918. Serial No. 265,580.

Drive Gearing for Mining Machines. J. A. Brantley, Sand Springs, Okla., 1,297,647. Mar. 18, 1919. Filed Feb. 3, 1917. Serial No. 146,414.

Center and Side Dump Car. J. O. Neilkirk, assignor to Rodger Ballast Car Co., a corporation of Maine, 1,299,212. Apr. 1, 1919. Filed June 4, 1917. Serial No. 172,637.

Central Station Heating; Its Economic Features, with Reference to Community Service. By John C. White. Technical Paper 191. Department of the Interior, Bureau of Mines. Illustrated; pp. 23; 6 x 9 inches.

Trade Catalogs

Saving 63 Per Cent. of the Drinking Water Expense. Armstrong Cork and Insulation Co., Pittsburgh, Penn. Folder. Pp. 4; 3½ x 5½ in.; illustrated. Comparison of the old bucket with the new pipe system.

The Scoop Conveyor. Portable Machinery Co., Inc., Passaic, N. J. Circular. Pp. 2;

8½ x 11 in.; illustrated. Compares original conveyor with an imitation which has been put on the market.

Centrifugal Pumps. Dayton-Dowd, Quincy, Ill. Bulletin 240. Pp. 15; 7½ x 10½ in.; illustrated. Contains descriptive matter about the pumps in question, also useful information.

Van Dorn Portable Electric Drills. Van Dorn Electric Tool Co., Cleveland, Ohio. Catalog. Pp. 51; 3½ x 8½ in.; illustrated. Describes and illustrates the various types of drills made by this company.

The Vulcan Soot Cleaner. The Vulcan Soot Cleaner Co., Du Bois, Penn. Bulletin 541. Pp. 8; 8½ x 10½; illustrated. Illustrates and describes the Vulcan patent diagonal method for cleaning soot from the tubes of boilers.

Portable and Stationary Mine Pumps—Horizontal, Single and Double-Acting. The Deming Co., Salem, Ohio. Bulletin 310. Pp. 23; 6½ x 9½ in.; illustrated. Describes and illustrates the various types of these forms of mine pumps.

Sullivan Drills. Sullivan Machinery Co., Chicago, Ill. Booklet No. 118. Pp. 32; 3½ x 5½ in.; illustrated. Illustrates and describes Sullivan hammer and rock drills for every kind of rock excavation, in mine, quarry or on public work.

Fifteen Points of "Ironclad-Exide." The Electric Storage Battery Co., Allegheny Ave. and 19th St., Philadelphia, Penn. Booklet. Pp. 4½ x 7 in.; illustrated. Details of the company's storage battery, its performance and various applications.

Forgings. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin 1538. Pp. 18; 8 x 10½ in.; illustrated. Illustrates some of the company's forge and machine shop equipment used in the production of forgings.

Chart Giving Relations Between Power, Shaft Diameter, Torsional Stress and Speed. The Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin No. 22, June, 1919. Pp. 4; 8½ x 11 in.; illustrated. Graphical charts and directions showing method of use.

Electrical Precipitation. The Recovery of Valuable Material from Smoke and Gases. Application Circular 7375. Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. Pp. 23; 8½ x 11 in.; illustrated. Discusses suppression of dust and fumes and principles of electrical precipitation. Types of equipment noted.

Industrial News

Tylersville, Penn.—The Canonsburg Gas Coal Co., has a new plant under construction at this place. A 250-ft. shaft mine is expected to furnish an output of 1500 tons daily.

Sandoval—The Chicago Sandoval Coal Co. is installing electric haulage, including two 100-KW, 250-volt generators direct connected to tandem, compound, high-speed engines. Three 6½-ton electric locomotives will be used.

Dunmore, Penn.—The Ronna Coal Co. of this place, is understood to be considering plans for the reconstruction of the coal washery at its local plant. The estimated cost of rebuilding the washery is placed at about \$100,000. W. P. Jennings is general manager.

Marion, Ind.—The Marion Machine, Foundry and Supply Co. of this place, has recently purchased 15 acres of land adjoining its present property and is entirely rebuilding and enlarging the old plant at a cost of \$100,000. This step has been made necessary in order to cope with the company's rapidly increasing business.

Wheeling, W. Va.—The Williams Improved Stretcher Co. receives frequent orders for quantities of stretchers for use in the United States navy. The standard patented Williams stretcher meets every requirement specified by the navy. Many of the reasons which recommend this type for mine service warrant its use under trying conditions in other fields.

Gassaway, W. Va.—Work is being rushed by the West Virginia Coal and Coke Co. on its new No. 12 colliery near Bower, W. Va., (on the Coal and Coke Ry. in Braxton County), where a tippie is being built. This company is also pushing development work on its No. 8 plant near Norton, W. Va., in the Randolph County field. The vice president and general manager of this company is E. Drennen, of Elkins, W. Va.

Columbus, Ohio—With car shortage developing rapidly in many producing fields of the state, it is rather an anomaly to

have 4000 hopper dump cars idle. But such is the case and that number are crowding the sidings in and around Columbus because of a controversy over the price of the cars. The contract for their manufacture was made by the Railroad Administration and now individual roads will not pay the contract price.

Wheeling, W. Va.—Engineers have been making surveys for a large coal-mining plant for the Derrick & Derrick Coal Co., on Fish Creek, Marshall County. An initial outlay of several thousand dollars is planned. This company is composed of Scottsdale, Penn., capitalists and it has secured control of 3000 acres of Pittsburgh seam coal on Fish Creek. The tract was formerly owned by A. D. Williams, of Uniontown, Penn., and the Derrick estate.

Welch, W. Va.—Extensive improvements are under way at two plants at the Central Pocahontas Coal Co. near here. Nearly 50 new houses for the miners are being erected at the Caples plant; a new drainage system is being installed and a welfare building erected for the employees. The principal improvement under way at the O'Toole plant is the construction of a fine club house for the use of employees. The general manager of the Central Pocahontas Co. is W. J. O'Toole.

Huntington, W. Va.—The Ohio Valley Car and Mine Machinery Co., of this city, has completed arrangements for the purchase of the plant of the Kyle Smith Aircraft Co. as well as for property adjoining that plant in this city; the company will utilize the plant in the manufacture of mine cars and other mining machinery. The company was reorganized not long ago by E. M. Brown and others; at that time it was the intention of the company to operate its plant in Iron-ton; since that time the company's plans have been changed.

Birmingham, Ala.—Notes to the amount of \$6,000,000 are being offered for sale, proceeds of which will be used for the extensive development and improvement of the properties of the Sloss-Sheffield Steel and Iron Co. The funds thus made available will be employed to complete by-product coke ovens, for building a central power station, the electrification of mines, the acquisition of additional properties and for other general improvements. This company's coal properties are in Walker and Jefferson counties, Birmingham being in the latter county.

Logan, W. Va.—Plans for the early operation of the new plant of the Three-Forks Coal Co. at Lundale are being executed. This is a \$600,000-company which was organized by Geo. M. Jones, a prominent operator of the Logan field in association with other well known coal men of that field. Construction work includes the completion of the branch railroad to the plant as well as to the building of 100 cottages for the miners. The company also has under construction a temporary tippie, and is putting up a modern store and office building as well as a club house for the use of employees.

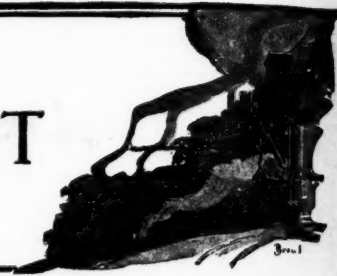
Washington, Penn.—The Lincoln Gas Coal Co., of Pittsburgh, Penn., is developing a large acreage of coal west of this place. Superintendent George Watson of this company announced recently the completion of plans for doubling the capacity of the plant, necessitating the employment of twice the number of men and the construction of about 70 new houses. Work on the new tippie is under way and 15 of the houses are in various stages of construction; the houses can be bought by the employees at cost of construction. This company expects to build a large community amusement house, with a theater to seat 500, and other recreational features.

Louisville, Ky.—The Kentucky & West Virginia Power Co., of Hazard, Ky., with a capital of \$6,000,000, by Bailey P. Wooten, Harry T. Taylor, J. G. Greene and others, has taken over three large power plants in the coal fields of Kentucky and West Virginia. The company is said to be backed by the American Gas and Electric Co., of New York City. The companies taken over include, the Kentucky River Power Co., with offices at Hazard, Ky.; the Tug River Electric Co., of Sprigg, West Virginia, and the Logan County Light and Power Co., of Logan, W. Va. The main offices will be at Philadelphia. The individual companies have been furnishing power for hundreds of mines, the Hazard company alone having 45 mines on central station service. It has been announced that connecting lines will be run between the plants so that in event of a breakdown at one plant the other two may carry the load without interfering with the service. It is also said that lines will be extended into the Elkhorn and other fields, and power furnished to many operators.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

*Soft Coal Market Still Active—Consumers Show Keen Discrimination When Buying Coal—
Better Grades of Soft Coal Up in Price and Hard to Get—Anthracite
Situation Well in Hand*

THE bituminous market continues active. A noticeable feature of the buying is the keen discrimination that is being shown by consumers who are not covered by contract. Only the better grade coals are wanted, and this in spite of the fact that prices on the quality grades are continually advancing, while the poorer coals are still selling at the price levels that obtained three or four weeks ago.

Spot sales are being shipped with great promptness. While it cannot be said that there is an abundance of coal, there seems nevertheless to be sufficient to meet all requirements, and prices are gradually going to higher levels. The better grades are practically out of the market, and as time goes on consumers will be forced to rely more on the medium to fair grades of fuel, which have also advanced in price.

Reports of car shortages in the mining regions are more numerous. In the Pittsburgh district, for instance, many operations that have plenty of orders

on hand have been forced to curtail production for lack of cars in which to ship the product, while in many of the Middle West mines operation was at a standstill for days at a time because cars were not received. Fear is expressed that the car supply the country over will become still poorer as the season advances and the movement of grain begins.

Many inquiries are being received in the United States from representatives of foreign governments that desire coal, and the export business is active. Trouble is being experienced, however, in chartering bottoms.

During the week ended July 26 the production of soft coal totaled 9,990,000 net tons, an increase of 78,000 net tons as compared with the output of the preceding week. The production of bituminous coal is at a lower rate than in 1917 and 1918, the greater falling off in output being reported from the mining districts of the South and Middle West.

Dealers are in a better frame of mind concerning the future in anthracite. Production is steadily increasing, the output for the week ended July 26 being estimated at 1,827,000 net tons. At this rate the situation before long will be well in hand. While winter may find many dealers with orders unfilled, at least every consumer will have some fuel on hand.

Egg and stove coals remain scarce, with chestnut much easier, although no surplus exists. Pea coal is more readily obtainable, but is by no means a drug on the market. The demand for steam coals is more pronounced than it has been. Buckwheat No. 1 is scarce, with rice and barley more plentiful than buckwheat. Consumers are eager to store larger quantities of steam coals, as they have learned that the production of steam sizes has been reduced by the closing down of many washeries which were formerly engaged in the turning out of these sizes. The steam coal market is tightening.

WEEKLY COAL PRODUCTION

The new level of output of bituminous coal to which production jumped the second week in July, after months of extremely low records, was maintained in the week of July 26. Estimates placed the production in that week at 9,990,000 tons, compared with 9,912,000 tons the preceding week. The rate of production has not yet passed that in 1917 and is of course much below that of 1918. The total production of bituminous coal from Jan. 1 to July 26, estimated at 250,478,000 tons, which compared with 334,000,000 tons in the same period last year, represents a decrease of 83,500,000 tons, or 25 per cent. The decrease has been much greater in the Middle West and South than in the East. The percentages of decrease this year, compared with 1918, range from 10 in Virginia to 22 in the Somerset district of Pennsylvania, and 27 in Ohio, in the East, up to 34 in the Middle West and 39 in Alabama. In other words, the industrial demand has been better along the eastern and northern Atlantic coast than in Michigan and the Mississippi and the Missouri Valley territory. And, further, the higher-grade coals from the eastern fields have generally been in better demand than western coals, even in the Middle West markets.

Production of anthracite, which increased in the middle of June in response to a growing demand, from a weekly rate of around 1,700,000 net tons to better than 1,800,000 tons, maintained the rate in the week of July 26. Production in that week is estimated at 1,827,000 net tons, compared with 1,823,000 tons the previous week. Considering only the period from Apr. 1, the beginning of the coal year, production this year is estimated at 28,633,000 net tons, or 4,800,000 tons behind the same period last year. The largest part of this

decrease is shown by statistics just available to have been in the fine sizes. Many of the culm-bank washeries that were able to operate last year, when the demand for steam coal was at its height, this year have been closed down and the output of steam sizes has declined materially. The actual decrease in domestic sizes is not more than 1,500,000 net tons.

Percentage of full-time operation declined from 67.6 in the week of July 12 to 64.0 the week of July 19. The average of no-market losses was about the same in the two weeks, but losses because of car shortage increased from 2.8 to 7.4, the average for the country the third week of July, this year, being greater than in the corresponding week of 1918.

In the Middle West the situation in Illinois and Indiana has not changed in the last few weeks, but western Kentucky reports increasing demand, and for the week of July 19 a marked increase in car shortage. Demand in the Southwestern States has shown a consistent but slow improvement in the past two months. Car supply has been good, but labor shortage has increased since the first of July. In Washington and the Rocky Mountain States three-quarters full-time operation is being maintained with lack of demand the principal limiting factor.

The situation in Alabama has varied but slightly in the past eight weeks, with about three-fourths full-time operation, limited mainly by lack of demand; the Southern Appalachian district has not been doing so well, but Harlan has averaged nearer 90 per cent. There were marked increases in car shortage in all the eastern Kentucky fields the week of July 19, coincident with better demand. The market for southern Ohio coal though still limited is improving, and car supply is good; in northern and

central Ohio demand has taken up the supply now limited by car shortage.

In West Virginia demand and car supply in the smokeless fields as a whole are now better than the average, but in the high-volatile fields in the southern part of the state a greatly improved demand is coupled with a marked lack of cars. Incomplete data from the Fairmont field show about one-half running time with both no market and car shortage sharing in the cause of the losses.

After three weeks of good car supply, western Pennsylvania in the week of July 19 reports loss of time on account of car shortage of more than 7 per cent. In the Somerset, Westmoreland and adjacent districts demand is good but output is limited by increasing car shortage. Central Pennsylvania mines have been averaging about four days a week operation with lack of market accounting for the greater part of the loss.

The output of beehive coke in the week ended July 26 is estimated at 369,900 net tons, an increase of 7 per cent., compared with the previous week, but 41 per cent. below the corresponding week of 1918. Lack of demand is entirely responsible for the low production this year, the curtailment in iron production and the increase in byproduct coke capacity being the causes.

Shipments of lake coal after dropping below last year in the week of July 12, again rose, and the record for the week of July 19—920,184 tons—exceeds the 904,000 tons in the corresponding week of 1918. The total to date is now 11,849,900 tons, about 1,000,000 tons above last year for the same period. From the first of August to the middle of October, 1918, lake shipments were maintained well above 1,000,000 tons a week, 1,200,000 tons hav-

ing been exceeded in eight out of twelve weeks.

A smaller percentage of lake coal, shipped so far this year, is destined for Canada than in 1918. Statistics through June show that 25 per cent. of lake cargo coal moved to Canada in 1918, whereas in 1919 the percentage was 18 per cent. To the end of June, this year, there had been 1,548,000 tons of lake coal shipped to Canada, compared with 1,786,000 tons in 1918.

In the first six months of 1919 shipments of bituminous coal to the Atlantic tidewater ports, including Charleston, were 16,627,000 net tons, a decrease compared with 20,163,000 net tons in 1918, of 3,536,000 tons, or 17.5 per cent. The largest decreases were from the fields reaching tide at Hampton Roads, more than 1,000,000 tons each on the Chesapeake & Ohio and Norfolk & Western, and more than 500,000 tons on the Virginian. Shipments to tide from mines on the Baltimore & Ohio increased about 300,000 tons, and shipments over the Southern Ry. to Charleston nearly trebled.

Although the total tidewater dumpings increased 17.5 per cent., coal destined for New England decreased 42 per cent. in the first half of 1919, compared with 1918. The New England tidewater tonnage from January to June, 1919, was 3,963,000 net tons, compared with 6,865,000 net tons in the same period of 1918. New England coal from Hampton Roads decreased from 4,278,000 net tons in the first half of 1918 to 2,402,000 tons in 1919, a drop of 1,875,000 tons, or 44 per cent.

BUSINESS OPINIONS

Dry Goods Economist—One of the causes of the excellent business conditions in this country, conditions that are reflected in the sustained activity of the demand for textiles and kindred goods, is the remarkable increase in our exports and imports.

Marshall Field & Co.—Current wholesale distribution of dry goods was slightly in excess of the corresponding week a year ago. More merchants were in the market compared with the same week of 1916 and all reported excellent business. Orders from road salesmen for both immediate and fall delivery were greater in volume than for the same period last year. Collections are satisfactory.

The American Wool and Cotton Reporter.—Demand for wool continues strong, although for a week or so it has been somewhat spotty. The call is becoming greater for the medium and low wools because the fine wools have become so high and scarce. It is estimated that some 40 per cent. of the new clip has been absorbed. Fleeces are selling at high prices in the Middle West. The talk of a scarcity of cotton seems to be general, but the fact that there are not enough spindles in the world to use ten million bales of cotton of American production in addition to other supplies seems to be worthy of some consideration.

Atlantic Seaboard

BOSTON

Market continues active, although there are signs of reaction. Spot sales being shipped promptly. Higher grades increasingly difficult to get. Prices of medium grades advance only moderately. Buying thus far largely confined to middle houses. Movement light over New York and Philadelphia piers, Hampton Roads coals show little change. Anthracite deliveries slow. Reading fleet tied up. "Independent" coal held for liberal premiums.

Bituminous—The week has disclosed quite an amount of active buying all-rail. Steam-users who have contracts have been making quiet efforts to get "a little more" as insurance against any breakdown in deliveries later, but to this point there has been no broad market for coal "without guaranty as to quality." Quite to the contrary, buyers in New England are insisting upon grades of known value, and the trade does not recall a time when there was so much intelligent discrimination between coals of different origin.

For a few days the market stiffened consistently, but quite naturally. In a situation of this kind, shippers of some of the second-rate coals boosted prices rather more rapidly than current demand would warrant, and at this writing there are signs of a reaction that is expected to be only temporary. For a day or two options were given for only a few hours, and the volume of coal placed must have been fairly large for spot tonnage and at this

season. Now, however, particularly on Beech Creek and coals of that character, the figures quoted somewhat over-step what would be considered a fair market price. Certain buyers have ceased making purchases for that reason.

It is a commentary on the state of business when spot sales are shipped with great promptness, as is the case today. Apparently operators are seizing upon advanced prices with great avidity. It also tends to show how relatively few contracts were placed this season on the fair to medium grades from the Cambria and Clearfield districts. Offerings for delivery beyond September are now very few, so much confidence is there in higher prices in the fall.

The best grades from South Fork and other Cambria districts are harder each week to buy, or even to get deliveries on contract. The export and bunker trades are most attractive and, until the spot market all-rail rises to the figures offered to coal ships, the bulk of the free output is certain to go to New York distributors. Demurrage charges at the piers have some bearing, but where bunker coal is being constantly sought, the price range is high enough to relieve the shipper of any worry on this score.

This will account for the much improved demand for coals of medium quality. Buyers who must have volume shipments are obliged to be less finicky, so long as the coal is low volatile and does lend itself readily to spontaneous combustion. Grades that sold at first hands for \$2.50 per net ton a fortnight ago have lately sold up to \$2.85, although the latter does not represent the state of the market in this territory at this writing. Through agencies \$3.15@3.25 has been paid for slightly better grades from favorably known operations, but there is no assurance that the same coals will continue to advance in price at the same rate.

On Pocahontas and New River there are apparently no new developments. Prices are still on a \$6@6.25 f.o.b. vessel, but no such figure has been realized thus far on shipments to this territory. Factors here are making practically no commitments and are confining themselves to making such deliveries as they can on contract. Receipts have increased the past week, but the dependence of New England upon Hampton Roads this year is as nothing compared with 1917 and 1918. Consumers here are now looking with most anxiety to Central Pennsylvania.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons.	\$2.50@3.00	\$2.90@3.60
F. o. b. Philadelphia, gross tons.	4.69@5.25	5.10@5.80
F. o. b. New York, gross tons.	5.00@5.60	5.40@6.20
Alongside Boston (water coal), gross tons.	6.75@7.25	6.95@7.75

Georges Creek is quoted at \$3.70 per net ton, f. o. b. mines.

Pocahontas and New River are being quoted at \$6 @ 6.25 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There are practically no sales for coastwise shipment.

Anthracite—Shipments in July to this territory were somewhat larger than during June, although retail dealers throughout New England continue most anxious over the outlook. Deliveries are slow both all-rail and by water, and the sizes in most demand continue extremely hard to get. Pea and buckwheat are in ample supply with only small tonnages being absorbed. From New York, shipments by water have been even more irregular than early in the season, although the city markets have somewhat let up on the demand. The western trade is most insistent, however, and before long it is expected there will be an increased movement in that direction.

One of the disquieting features is the present tie-up of the Reading fleet. Beginning with last week several of the tugs have been laid up at Philadelphia without crews, until at this writing 9 of the 11 tugs upon which New England depends for so large a proportion of anthracite are lying idle pending the settlement of a wage dispute. There were indications the fleet would resume operations the latter part of last week, but the controversy is still unsettled. It will mean a setback of at least ten days or two weeks in the movement of coal to New England.

Premiums for coal originating with "independent" operators are being exacted up to \$1.50@1.75 over the company circular. Even at these prices there is difficulty getting deliveries, and there are no signs of an easier demand.

NEW YORK

Better feeling exists in the anthracite market. Coal moves easier, but there is no let-up in demand. New York tidewater expects larger shipments in September. Much heard of high premiums, but the reported average is much lower. The buckwheats in good demand. Bituminous is active and prices stronger. Consumers stocking up. The best grades short.

Anthracite—There is a better tone to the anthracite market. Dealers are in a better frame of mind regarding the future, and while there has been no let-up in demand for coal, the situation appears to be more settled. Coal is moving faster and retail dealers appear to be better satisfied.

The trade here is inactive. Dealers are well booked ahead and, while receiving a goodly portion of their standing orders from the larger companies, are in the field for whatever independent product they can obtain. The latter operators are well sold ahead, and while one hears of premiums ranging from 50c. to \$1.50 per ton for domestic coals, according to place of destination, it was stated that the average premium would be around 75c. As a rule it was stated that even that was about 25c. more than New York dealers were paying.

Egg and stove coals remain scarce, but chestnut is much easier, although there is no surplus. Pea coal is not so tight as a week ago, but it is by no means a drug on the market.

The market for the steam coals is stronger. Buckwheat No. 1 is by no means as free as it has been and shippers say quotations are not so easy. Consumers are in the mood for storing large quantities in anticipation of a shortage and higher prices, inasmuch as the production of these coals has been reduced by the non-operation of the washeries. Rice and barley are more plentiful than buckwheat, but there is no desire to move them by price concessions.

Quotations for company white ash coals, per gross ton at the mines f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken.....	\$5.95	\$7.80
Egg.....	6.25	8.10
Stove.....	6.50	8.35
Chestnut.....	6.60	8.45
Pea.....	5.20	6.95
Buckwheat.....	3.40	5.15
Rice.....	2.75	4.50
Barley.....	2.25	4.00

At the conclusion of the hearings before the Interstate Commerce Commission of the complaint of the Wholesale Coal Trade Association of New York against the United States Railroad Administration, held at the Waldorf-Astoria Hotel, it was felt that a strong case had been presented by the complainant. The hearings were not concluded until July 31, having been going on for ten days. Many witnesses were heard on both sides. Commissioner McChord, who heard the testimony the last few days of the hearings, gave both sides until Oct. 1 to submit briefs. An early decision is looked for.

Bituminous—A very active market exists here. While it cannot be said there is an abundance of coal at the local piers, there is plenty to meet all requirements and prices are gradually going to higher levels. Buyers are continually in the market and the consumer who failed to take advantage of the advice given in the early spring to sign a contract is not finding it as easy to obtain the kind of coal he wants as he thought it would be.

The better grades are practically out of the market, and the demand has fallen on the medium and fair grades, the advance in prices being noticeable in the quotations for those coals.

The improvement has been reflected in all phases of the industry. Demand has increased all around and large consumers have been able to store large tonnages in their factory yards. One drawback, however, is the lack of cars. The railroads are not able to keep the mines supplied with cars, and fear is expressed that the supply will be poorer as the season advances and the movement of grain begins.

Handlers of bunker coals report increased business now that the marine labor troubles are over, the greatest difficulty being to obtain the quick loading and unloading of barges.

The export situation is active, although shippers have some trouble in chartering bottoms. Many inquiries are being received from representatives of foreign governments as well as from consumers, all

of whom are said to be willing to pay good prices provided they can be assured of prompt deliveries.

With contract coals moving in good volume the best grades are easily absorbed and spot buyers are forced to take the other grades.

Prices quoted for the various tidewater pools show an increase, the quotations ranging about as follows:

Pools 1 and 71.....	\$5.60 to \$5.75
Pool 9.....	5.60 to 5.75
Pool 10.....	5.50 to 5.60
Pool 11.....	5.15 to 5.35
Pool 18.....	4.75 to 4.85

There were many changes in the current quotations for the various grades of coal at the mines. They range as follows:

	Spot
South Fork (best).....	\$3.10—\$3.25
Cambria (best).....	2.95—3.10
Cambria (ordinary).....	2.65—2.90
Clearfield (best).....	2.95—3.10
Clearfield (ordinary).....	2.65—2.90
Reynoldsville.....	2.70—2.90
Quemahoning.....	3.10—3.25
Somerset (best).....	2.95—3.10
Somerset (poor).....	2.65—2.75
Western Maryland.....	2.50—2.75
Fairmont.....	2.10—2.35
Latrobe.....	2.60—2.65
Greensburg.....	2.50—2.60
Westmoreland, 1 in.....	2.75—2.90
Westmoreland run-of-mine.....	2.50—2.60

PHILADELPHIA

Anthracite prices go up. Individual increases large, ranging from 45c. to \$1.60. Company schedule adheres to fixed advance. Retail prices likely to respond accordingly. Public criticism imminent. Egg, stove and nut all short. Pea plentiful. With relatively low price this size is likely to move better. Buckwheat slightly stronger. Other steam coal quiet. Bituminous prices up. Car shortage the cause. Even higher prices probable.

Anthracite—The trade was stirred this week by the announcement of heavy price increases by all individual shippers. The announcement by one concern, which has usually received a premium for its coal, was that August prices would be 45c. above company circular. It had previously intimated that the monthly increase would be 15c. per month instead of 10c. as practiced by company shippers. When this announcement was quickly followed by an increase of 75c. above company circular by one of the other independents the trade realized that the increases would be general. At this time there is hardly a company that has not made an advance of at least 45c.

It had been taken for granted ever since last month when some of the smaller shippers began adding to their prices that by the time winter prices became effective all companies would reach the 75c. differential as in effect under the Fuel Administration and which the officials decreed was a proper one. Whether it is the intention of the shippers to even go beyond this price is now a question. The explanation given for the increase is that the companies claim they have been operating at a loss since the first of the year and there was nothing else for them to do but to increase the mine price. Among smaller producers and some brokers the increases have been from \$1.25 to \$1.60 a ton on prepared sizes. Almost all of the individual companies are holding pea at the company price, but there is no doubt that with the coming of real coal-burning weather pea will also be proportionately increased.

Despite the increase in prices the retailers have not shown the least hesitancy to accept shipments. They need coal to fill the orders on their books and more than one shipper received inquiries if they could make additional shipments to new customers at the increased prices.

The local market is almost bare of the large domestic sizes. Of pea there is still a plenitude. Egg and stove have in no way eased up and chestnut is fast approaching the same class. Because of wet weather the previous week some dealers seemed to have been accumulating a stock, but this was only because the rainy weather had held back deliveries. Little comfort is obtained by them from the shipping offices, when they are informed that the outside markets must be given the usual summer attention before it is possible to divert coal in this direction. With the natural increase in the larger family sizes the dealers are expecting a much livelier demand for pea coal and it would not be at all surprising to see the fairly large stocks of this begin to dwindle before the actual coal-burning weather arrives.

There is no particular improvement in the steam trade, although there is a slight tendency toward an improved demand for buckwheat, especially from the concerns accustomed to stock heavily on this size. This is also explained by the growing demand for bituminous coal and the tendency to tightness now being displayed in that trade. While a little more rice is being taken this size has not improved to the extent of cutting down appreciably the amount going into storage. Barley continues inactive.

With the usual 10c. increase in company prices the quotations per gross ton at mines for line and tide shipments are as follows:

	Line	Tide		Line	Tide
Broken.....	\$5.95	\$7.60	Buckwheat.....	\$3.40	\$4.45
Egg.....	6.25	8.10	Rice.....	2.75	3.65
Stove.....	6.50	8.35	Boiler.....	2.50	3.50
Nut.....	6.60	8.45	Barley.....	2.25	3.15
Pea.....	5.20	6.80			

Bituminous—In the soft coal trade there have also been quite substantial price increases. The advances were greatest in the Fairmont region, the increase in some instances being as much as 40c., although the average was around 20c. The higher prices asked have been due principally to the bad car supply, this being such as to greatly curtail production in the mining regions. It would seem that there are plenty of cars, but owing to the condition of much of the equipment many hundreds of cars are not in service.

On account of the car shortage high-grade coals were almost entirely out of the market and even medium grades were hard to get. Encouraged by the better prices a number of operations idle for several months are again coming into the market with their offering of tonnage, although they are finding it difficult to man their works.

There is a greatly increased tendency on the part of buyers to take in fuel, as they are finally becoming convinced of the need to have a stock of coal on hand to meet the difficulties of transportation later in the year. As it is only the fact that coal that would ordinarily be handled at tide has gone into the line trade has prevented a greater scarcity locally. Owing to the difficulty with marine workers the tide business continues unsatisfactory in many respects.

The prices per net ton in effect lately are as follows:

Georges Creek Big Vein.....	\$3.15 @ \$3.30
South Fork Miller Vein.....	3.15 @ 3.30
Clearfield (ordinary).....	2.90 @ 3.00
Somerset (ordinary).....	2.80 @ 2.95
Fairmont lump.....	2.70 @ 2.80
Fairmont mine-run.....	2.50 @ 2.60
Fairmont slack.....	2.00 @ 2.15
Fairmont lump (ordinary).....	2.40 @ 2.50
Fairmont mine-run (ordinary).....	2.15 @ 2.25
Fairmont slack (ordinary).....	2.00 @ 2.15

BALTIMORE

Strike ended, embargo lifted, and both foreign and domestic demand strong. Some large consumers preparing to stock. Anthracite schedules advanced for August.

Bituminous—With the shipping strike at an end, the embargo against shipments to the piers here lifted for any one who has a bottom waiting or some ready disposal means at hand, and with the export and local demands both active, there is now hope that an early clearing of the excess coal here will be recorded. The freight jam at eastern ports caused serious delay in the arrival of empties in the mining districts that ship through the Cumberland gateway, and the recent past saw the usual movement of some 1000 loaded cars a day reduced to less than a 600 per day average. Some mining regions complained that they did not have a 30 per cent. supply, and quite a few mines had no cars at all on some days of the past week.

The coal at tide and the preferred coal coming through enabled another good movement on export the past week, as nearly 50,000 tons was loaded on cargo and bunker foreign account. The total loading for the month of July will run approximately 250,000 tons, the highest total in the history of the trade here except for the months of June and July of 1915, which was the banner coal exporting year of this port.

The local situation continues pretty brisk, although there is some little let up in demand from smaller manufacturers who have been storing coal. Some of the larger consumers are now beginning to look about for storage coal, however, and a well sustained market seems likely, although some dealers believe that a slump

may come in the early fall because the Lakes seem destined to close some weeks ahead of the usual time since that region is getting its stocks unusually early this year.

Prices here are well maintained, low grade coals selling at from \$2.25 to \$2.50, with medium to good coals all the way from \$2.75 to \$3.25 mine basis to the trade. Some weakness was shown in better grade gas coals because of the jam here at tide, and there were offerings off the usual run around \$2.50.

Anthracite—An August schedule of prices has been set by the Baltimore Coal Exchange for this territory—unless a freight rate increase is ordered during the month; in which case the jump will be added to the retail prices announced. It was decided to put 25 cents a ton on egg, stove and chestnut sizes of hard white ash and Lykens Valley. The price on broken, pea and buckwheat was left unchanged. It was also decided not to advance Sunbury prices, which thus become the same as for hard white ash. The new schedule is as follows:

Hard white ash—Broken per long ton, \$11.50; egg, \$12; stove, \$12.25; chestnut, \$12.35; pea coal, \$10.25; buckwheat, \$8.20. Sunbury, egg, \$12; stove, \$12.25; chestnut, \$12.35. Lykens Valley, egg, \$12.70; stove, \$13.10; chestnut, \$13.10.

Lake Markets

PITTSBURGH

No heavy emigration. Car shortages restricting production.

Conditions in the Pittsburgh district coal trade continue in a state of flux. On the one hand there is observed a noteworthy absence of that emigration of labor to foreign countries that was not only predicted but weeks ago was claimed to be actually occurring. On the other hand, car shortages are more numerous and in many parts of the district are actually curtailing the production of coal companies that are well supplied with orders. Again, there is more discrimination as to character of coal, whereby the spread between gas coal and steam coal has been widening, the former advancing while the latter is at about the same prices as for three or four weeks past.

The value of coal is continually increasing, particularly in the case of gas coal. This is reflected not only by the spot market but by the monthly settlements made for contracts that are not a flat price. One important gas coal contract with a steel interest was settled for July at 5c. over June, while the August settlement of course with the full consent of the consumer, is at 25c. over July, carrying the price to a point above \$2.35.

The market is separating widely the low sulphur, low phosphorus, high volatile, long-flame Youghiogheny gas coal from the steam coals of the Pittsburgh district, there being now quite a divergence in price. Coal operators refer to this as one of the results of the war, steel producers finding that it is greatly to their advantage to use this coal not simply for producer work as formerly but also in heating furnaces. During the war the steel producers were forced to use much coal that was unsuitable and thus they learned what a wide range there is in coals, merely from different parts of the Pittsburgh district.

We quote gas coal higher than a week ago and steam coal stiffer but not notably higher, prices for spot and nearby shipment being: Steam slack, \$1.50@1.70; gas slack, \$2@2.30; steam mine-run, \$2.25@2.40; gas mine-run, \$2.50@2.70; 1/2 in. gas, \$2.80@3, per net ton at mine, Pittsburgh district.

TORONTO

Great shortage of stove coal. Teamster strike interferes with deliveries. Transportation slow. Demand for bituminous begins to show improvement.

The outstanding feature of the coal market continues to be the shortage of stove coal, the great bulk of domestic orders being for this grade. Dealers are generally refusing orders or accepting them only at the price prevailing at the time of delivery. Nut, egg and pea coal are obtainable, but some of the yards are badly handicapped in deliveries by the strike of teamsters. Transportation continues slow, and not much improvement is anticipated until the close of navigation diverts the supply from the upper lake ports. Many of the industrial plants which have been closed on account of the strike in the metal trades are resuming operations, and bituminous coal, which has been little in demand for

some time, is beginning to move more freely.

Quotations for short tons are as follows:

Anthracite, egg, stove, nut and grate.....	\$11.50
Pea.....	10.00
Bituminous steam.....	8.00
Slack.....	7.00
Domestic lump.....	10.00
Cannel.....	11.50
Wholesale f. o. b. cars at destination:	
Three-quarter lump.....	6.10
Slack.....	5.00

BUFFALO

Quiet bituminous market. Slow improvement with prices firmer. Gas coal strong. Jobbers find caution necessary. Cars not plentiful. Anthracite in usual heavy demand.

Bituminous—The situation improves slowly. Shippers find consumers are eager as ever to make contracts, but do not find operators willing to sell much coal on time. They are well supplied with spot coal and can usually find cars enough to move it in, though the supply is not as good as it was and is apparently running down. The effort to push coal into market is not so great as it was, for the idea of an early boom has been dropped for the most part. There is a fair market and that is all that is now looked for.

The outlook is for a slow stiffening of the market all along the line, so that by fall the movement will be good and profits adequate. As it is, neither the operator nor the jobber is getting what he is entitled to. The greater degree of satisfaction reported is really because this period is following one in which little or no profit was made by anyone. Improvement is general, but it is not as great as it was expected to be. The best of the situation is that a better market is ahead. Everybody is confident of that.

Bituminous prices are firmer from week to week, but the change is slight. Quotations are as follows: Allegheny Valley sizes, \$4.45; Pittsburgh and No. 8 lump, \$4.80; same three-quarter, \$4.65; mine run, \$4.20; all slack, \$3.70; Pennsylvania smokeless, \$4.60; smithing, \$5.70, all per net ton, f.o.b., Buffalo.

Anthracite—The situation does not change much. People study the reports of mining and find little that looks like relief from that direction. The winter shortage seems to be a certainty, unless the consumption has fallen off materially. That, with a mild winter, would help the consumer, but neither can be depended upon. Nobody knows what shape the consumer is in for as a rule he is taking all the coal he can get and maybe is hoarding it as he was two years ago. There is no fuel administration to look into the situation now. Shippers are piecing out their supply as well as they can, giving nobody all that is asked and so are trying to make the best of it.

An effort is making to induce anthracite consumers to buy coke, which is being offered at \$6.60 net f.o.b. here and ought to look attractive at that price, but it has not sold actively yet.

CLEVELAND

Steam-coal demand has come out in greatly increased volume in the last 10 days. Mine operations appear to have been increased about proportionately, despite the labor and car shortage. Prices on practically every grade have been advanced slightly. Domestic coal demand continues in excess of normal for this time of year.

Bituminous—The great wave of buying which has been sweeping over the East, according to operators here, has increased by about 15 per cent. the demand for steam coal. An evident desire to stock is being expressed by almost every consumer. Some who have been refusing to buy other than from hand to mouth for the past six months have experienced a change of heart. Steam-coal demand in northern Ohio has been increasing consistently for some time, and now is not far below the normal of pre-war years.

Southern and eastern Ohio mines continue to be hampered by car shortage, which still appears in spots. A full supply one day is likely to be followed by one of 20 per cent. the next. But with orders rushing in the mines appear to be rising to the occasion. The noticeable slowing down in requirements for the lake trade has released a sizable tonnage each week for northern Ohio. Labor which left the mine regions early in the year is now almost all back. Offsetting this to an extent is the exodus of foreign labor to Europe.

Pocahontas and Anthracite—Retail dealers still could dispose of 20 per cent. more than they are receiving of both grades. The

cry continues one not of slack demand but of slack shipments. The way consumers are buying, winter will find them just about 100 per cent. stocked. Pocahontas prices remain stationary, but the four anthracite grades quoted have been pushed up. Some dealers are threatening to increase Pocahontas prices soon.

Lake Trade—Bituminous coal shipments to the head of the Great Lakes are scarcely able to top the 850,000-ton mark these weeks, due primarily to the shortage of cars. More coal is now coming forward, proportionately, from the No. 8 than from the Pittsburgh district. At the rate shipments are falling off—they are about 200,000 tons a week under last season's movement—another six or seven weeks will see 1919's total behind 1918's. Last year coal just began to move at this time, while shipments this season will show a tendency to drop as the season wears on. Some of the larger freighters must go to several docks in order to get a full cargo, and much time is being lost at the lower end of the route.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg.....	\$11.15 to \$11.25
Chestnut.....	11.65 to 11.75
Grate.....	11.45 to 11.55
Stove.....	11.55 to 11.65

Pocahontas:	
Forked.....	9.50
Lump.....	8.50 to 8.75
Mine-run.....	7.50

Domestic Bituminous:	
West Virginia splint.....	7.80 to 8.10
No. 8 Pittsburgh.....	6.30 to 6.65
Massillon lump.....	7.50 to 7.70

Steam Coal:	
No. 6 slack.....	4.35 to 4.55
No. 8 slack.....	4.90 to 5.10
Youghiogheny slack.....	4.95 to 5.25
No. 8 4-in.....	5.60 to 5.75
No. 6 mine-run.....	4.70 to 4.80
No. 8 mine-run.....	5.10 to 5.20

DETROIT

Sales of steam and domestic sizes of bituminous are of small amount and more or less irregular.

Bituminous—Buyers are not evincing the disposition to stock up that the general outlook in the coal trade would seem to justify, according to Detroit wholesalers and jobbers. The orders placed are described as of small proportions and rather irregular, suggesting a tendency to avoid purchases until necessity arises for renewal of supplies. This is particularly applicable to a considerable proportion of the steam-coal trade.

Only a small amount of coal is to be found on tracks in Detroit, as the bulk of the shipments now are being made direct to consumers to avoid the risk attending operation of high demurrage charges. Jobbers say it is difficult to find coal around town that can be turned over to customers seeking immediate delivery.

On a net ton basis at the mine, Hocking is offered at \$2.75 for domestic lump, \$2 for mine run, and about \$1.50 for slack Pittsburgh No. 8, three-quarter lump is selling around \$2.50, mine run at \$2 and slack at \$1.75. West Virginia 4-in. lump is quoted at \$3.25 to \$3.50, 2-in. lump at \$3, mine run at \$2.25 to \$2.50 and slack at about \$1.85. Smokeless is scarce, mine run of that description selling for \$2.75 to \$3.

Anthracite—While some orders for anthracite are coming to retailers, the amount of business is of smaller size than the prospect of a shortage in supply would warrant. Dealers report shipments are delayed and that there is considerable lack of promptness in filling orders by producers.

Lake Trade—Less coal is being moved over the lake routes than in June and car shortage is curtailing shipments, particularly from the Pittsburgh region. Cargoes are fewer than the vessels offered for loading.

COLUMBUS

Domestic demand is increasing rather rapidly as dealers are stocking up for the rush of domestic business. This is the best feature of the trade as there is no perceptible increase in steam demand. Railroads are taking a larger tonnage, indicating a better freight movement. The lake trade is steady.

There is a better domestic demand from all producing sections in Ohio. This is due largely to increased orders from retailers, who are stocking up for the rush which is

expected some time in August. In fact there is quite an appreciable increase in domestic business reported from all sections of the state. The campaign, fostered by the National Coal Association, urging the public to lay in its coal supply is bearing fruit and as a result all producing sections have been benefited.

Retail stocks are not large although there is a general movement to increase them. Orders are being placed not only for the so called fancy fuels but also for Hocking, Crooksville and Pomeroy grades. Pocahontas is in good demand and prices range high. Smokeless is also moving well and splints are selling rapidly. In fact there are no domestic sizes that are a drag on the market as was the case several months ago. Good preparation is required but there is generally a market for all lump produced.

The steam trade does not show the strength that has developed in domestic sizes. Screenings are still a drag on the market and some extremely low prices are reported. Mine-run is not as strong as it might be under the circumstances. In fact the steam trade does not share the strength of domestic and there is little in the immediate future to encourage producers. While reserve stocks are not large in any section, still there is a disposition on the part of purchasing agents to wait. Some contracts have been made recently and prices show a distinctly higher tendency. But nevertheless there is a good deal of cheaper coal that can be had on the open market and this has the effect of depressing the entire trade.

The lake trade is rather active, considering conditions in the upper lake region. A considerable tonnage is moving from Ohio and West Virginia mines to the Northwest. Vessels are plentiful and the movement off the docks in the upper lake ports is good. Vessel rates and prices are unchanged from early in the season.

CINCINNATI

Each week brings about a better demand from domestic consumers, with all other lines continuing to show improvement. No particular change in prices is noted. Local dealers regard general conditions as satisfactory.

The demand for domestic coal has been quickened to a very perceptible extent within the past week especially, and is reflected in heavier buying by the retailers, who are insisting that there be no delay in shipments. The increased demand for domestic coal, especially of the better grades, is attributed to the nation-wide advertising campaign of the National Coal Association and also the local dealers who are using the daily press more liberally than in the past. Several local dealers are advertising smokeless coal for all uses, with prompt deliveries.

Most of the local dealers are confident that the warnings sent broadcast about the possibilities of a coal shortage have been heeded in all sections, and that there need be no cause for worry over any serious consequences such as were experienced in the winter of 1917-1918. Coal men read with interest the reports of the heavy demand for coal in the West Virginia districts, where mines are kept busy in an endeavor to meet requirements, and were relieved to hear that there will be no serious delay in shipping coal from the mines, having been assured that the car shortage that has existed for several weeks past soon will be relieved.

LOUISVILLE

Steam demand showing some steady improvement, with domestic coal in strong demand at high prices. Prospects for steady advance in coal prices. Car shortage becoming serious and causing considerable uneasiness.

The general demand for steam coal is showing steady improvement, shipments into the South going ahead nicely, while the lake region and Northwest shipments continue good. Retailers are buying all the good domestic coal that is offered, while mines in many instances are not offering any block coal at less than \$4 a ton for good eastern Kentucky grades except on regular accounts, where the price is around \$3.75. However, domestic coal is slightly easier to secure due to better demand for steam, but car supply is interfering with all deliveries.

It is conceded that from now until after the first of the year the outlook is for continual car shortage. Operators south of the Ohio River are pulling wires in Washington with hopes of some improvement, but according to figures of traffic experts the eastern Kentucky mines in the Harlan, Hazard and Southern Appalachian districts are not getting much over a 50 per cent. supply.

BIRMINGHAM

Fair demand for best grades of steam coal, the poorer quality moving slowly. Lump and nut maintain strong position. Car and labor shortage hindering factor in operations.

There is a fair demand for the better grades of steam fuel in this market, but the lower grades are experiencing a slack demand, and little tonnage is being disposed of outside contract requirements, the major portion going to the railroads. Railroad contracts have about all been disposed of except the Central of Georgia and A. B. & A., which are still negotiating for fuel. Spot business is confined to small tonnage. Prices range from \$2.45 for Big Seam and similar grades of mine-run to \$3.86 for Cahaba prepared sizes.

Domestic continues strong with prices ranging from \$3.50 to \$5.25 and \$5.50 for lump and nut sizes. Dealers are accumulating stocks very slowly, due to the production being below normal at the mines which are operating.

Shortage of equipment cut the production in this field last week, mines on the L. & N. losing much time on this account, and there was also a lack of adequate supply on the Southern Ry. lines. Owing to the fact that consumers cannot much longer stay out of the market, it is predicted in coal circles that there will be a very strong buying movement in the near future, to which an ever-increasing car shortage and also insufficient labor supply will add great difficulty in supplying. Under present operating conditions the mines cannot care for anything like a normal demand for fuel. Production for the week ending July 19 totaled 243,875 tons as reported to the Coal Operators Association.

Coke

CONNELLVILLE

Spot furnace coke easier than foundry. Little difficulty in car supply. Increased production from furnace ovens, merchant production being unchanged.

Spot coke is easier as to furnace grade and stiffer as to foundry grade. The minimum price that can be done on foundry coke is up 25c., while best brands are held at the same level as formerly. The easiness in spot furnace coke is represented by a larger supply available rather than by offerings at lower prices. Quite a large tonnage of coke, running into hundreds of carloads, has accumulated on track, in face of there being no demand for spot or prompt or spot shipment. Doubtless the furnaces ought to accumulate stocks against probable interruptions in service next winter, but it is probable that many have already done so. Others are probably waiting for bargains, but they are not seeking bargains by making bids, except in one or two instances in which the furnace intimates it would buy some coke for stocking at \$3.60 or \$3.75, the regular asking price being \$4.

Coke operators are experiencing little difficulty in the matter of car supply, shipments being held down more by lack of shipping instructions for loaded cars than by lack of empties, but prospects are rather poor for the operators receiving large supplies of coal cars should the coal market prove able to absorb much Connellsville coal. Box cars for loading foundry coke are almost a rarity, and even the old-line operators are shipping a great deal of foundry coke not simply in open top cars but in hoppers, gondolas being scarce likewise. Foundry coke is in good demand, and

brands formerly available at \$4.75 can no longer be had at that figure, while makers of favorite brands who were quoting \$5.25 and \$5.50 are still selling at those prices. The market is quotable as follows: Spot and prompt furnace, \$4; contract, \$4.25@4.50; spot and prompt foundry, \$5@5.50; contract, \$5@5.50, per net ton at ovens.

The Courier reports production in the Connellsville and Lower Connellsville region in the week ended July 26 at 190,025 tons, an increase of 25,805 tons on the part of the furnace ovens, merchant production being unchanged.

Buffalo—The coke trade is firm with prospect of further improvement indicated by liberal sales of iron ore lately, which will also keep the lake fleet active. The local furnaces mostly use byproduct coke, made in this vicinity. The prices are regulated by beehive coke at \$7.60 for 72-hr. Connellsville foundry, \$7.25 for 48-hr. furnace and \$7 for off trade, per net ton f.o.b. Buffalo.

Middle West

MILWAUKEE

Coal market dull and movement slow. Stocks piling up. Anthracite, soft coal and coke advanced in price.

The first of August witnessed the customary monthly advance of 10c. per ton in anthracite, with the exception of buckwheat, the price of which remains the same as was fixed at the opening of the season. All soft coal was marked up 25c. per ton and coke 50c. The cost of carrying in coal from trom truck to bins was made 75c. per ton, or an advance of 25c. The market continues dull, with a slow outward movement. Docks are becoming well stocked up. Receipts by lake up to this time aggregate 396,750 tons of anthracite and 1,613,177 tons of soft coal, a gain over the same period last year of 125,734 tons of the former and 256,628 tons of the latter.

ST. LOUIS

The local condition is precarious. No steam market. No cars, poor movement and few men. Domestic demands far exceed supply.

The local situation is gradually becoming the most serious that has confronted St. Louis since the early days of the Fuel Administration. For the past few weeks the situation in the Carterville field has been bad, and as this continued to grow worse it began to affect the other fields, with the result that the Standard field today is in as bad a shape as it could possibly be. Up to the present the supply of domestic coal has been equal to the demand, but this cannot continue for long unless conditions in the operating end change radically shortly.

In the Carterville field of Williamson and Franklin Counties the screening situation is beyond the operators. There is no apparent remedy for the present trouble that can be made effective at this time. Mines that can pile screenings on the ground have done so, and the railroads are now ruling that unless all coal is billed out no cars will be furnished for work the following day.

The cutting of prices on the steam sizes apparently has had little effect in moving them, and the steam market is at a standstill, with many mines idle because they cannot move these sizes. The mines that can move the steam sizes are handicapped on account of lack of equipment. The mines that have been working are beginning to lose men who

are going back to better places in the mines that are now opening up again after many months' suspension, and the condition is an unsatisfactory one from every angle.

Similar conditions prevail in the Du Quoin field, but prices there are not being maintained. The car situation there is extremely bad.

In the Mt. Olive field conditions seem to be better than in any of the other fields in Illinois. There is better working time, car supply is better, and for some unknown reason the steam sizes from this district seem to move more readily than from the other fields. A great deal of this tonnage moves to Kansas City, Omaha and Chicago. The railroad tonnage still keeps up from this district and in a general way conditions are quite satisfactory.

In the Standard field the car supply has been the source of the greatest worry the past week. When a mine did succeed in cleaning up the steam sizes, it would have to remain idle for two or three days before it got any more equipment. Some of the mines have been idle for a week because they cannot move the screenings, and some mines have gone to loading mine-run for the railroads rather than separate their coal. This has caused a decreased tonnage of domestic sizes, and if this is going to continue when the demand for Standard gets good, as it will a little later, then the problem will be a hard one to solve.

The market for Standard screenings is practically nothing at the present time. As the demand for lump continues to grow, the demand for screenings seems to decrease. The race riots and the numerous strikes in Chicago have shut off entirely a good supply of Standard screenings, with the result that the market went down to as low as 90c., and for a day or two no domestic sizes were offered and those that were offered did not seem to increase much in price. The operator in this field does not know what is ahead of him, and it is a case of where it is impossible to look ahead or to anticipate anything.

Locally, the domestic demand for coal is good, especially on Carterville coal. The Mt. Olive tonnage is increasing, but up to the present there is no unusual demand for Standard. This will come a little later.

The supply of anthracite is limited, with little coming in and no smokeless at all. A little Arkansas has been booked, but up to the present has not moved. The local supply of coke, which has been plentiful, is rapidly decreasing, it being shipped west and northwest.

The country demand is good for higher grade coals for domestic purposes. There is no steam demand at all.

The retail price on coal advanced 25c. per ton on the better grades. The circular price for August, sidewalk delivery, is: Carterville, \$6.25; Mt. Olive, \$5.50; Standard, \$5; Pennsylvania egg and grate, \$12.75; stove and chestnut, \$13; smokeless lump and egg, \$19.75; gashouse coke, \$8; byproduct coke, \$9.75.

The present prevailing prices are, f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump....	\$2.85@3.05	\$2.55	\$2.25@2.50
3x6 egg....	2.85@3.05	2.55	2.25@2.50
2x3 nut....	2.85@3.05	2.55	.....
1 1/2x2 nut....	2.85@3.05	.....	.....
Mine-run....	2.10@2.35	2.35	1.60@1.70
Screenings....	1.50@2.20	2.05	.90@1.00
2x6 egg....	.....	.....	1.90@2.00
2-in. lump....	.....	.....	1.90@2.00

* Indicates prices on Independent coal.

Williamson-Franklin County rate to St. Louis is \$1.07 1/2; other rates, \$0.92 1/2.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Aug. 4, 1919

STOCKS			BONDS		
Ticker	Bid	Asked		Bid	Asked
American Coal Co. of Allegheny.....	(ACL)	45	.....	96 1/2	.....
Burns Brothers, Com.....	(BB)	135	.....	75 1/2	.....
Burns Brothers, Pfd.....	(BB)	110	.....	89 1/2	89 1/2
Central Coal & Coke, Com.....	(CK)	55	.....	77 1/2	80 1/2
Central Coal & Coke, Pfd.....	(CK)	63	.....	87	88
Colorado Fuel & Iron, Com.....	(CF)	40	.....	96	.....
Colorado Fuel & Iron, Pfd.....	(CF)	125	.....	99 1/2	100
Consolidation Coal of Maryland.....	(CGM)	75	.....	77 1/2	.....
Elk Horn Coal, Com.....	(EH)	38	.....	90	.....
Elk Horn Coal, Pfd.....	(EH)	47	.....	80 1/2	84
Inland Creek Coal, Com.....	(ICR)	39	.....	83 1/2	87
Inland Creek Coal, Pfd.....	(ICR)	75	.....	93	.....
Jefferson & Clearfield Coal & Iron, Pfd.....	(JF)	5	.....	80 1/2	91
New Central Coal of West Va.....	(NCC)	69	.....	87	.....
Pittsburgh Coal, Com.....	(PC)	93	.....	55	70
Pittsburgh Coal, Pfd.....	(PC)	194	.....	84	85 1/2
Pond-Creek Coal.....	(PD)	62	.....	.....	.....
Virginia Iron, Coal & Coke.....	(VK)	65	.....	.....	.....